

PORTABLE

100

The magazine for
Model 100 users

FEBRUARY
1984

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TANDY 2000 INTRODUCED

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Cover photo by Charley Freiberg. Set by Boothbay Railway Village, Boothbay, ME. Cover models: Peter Montross and Manley Stover, Sr.

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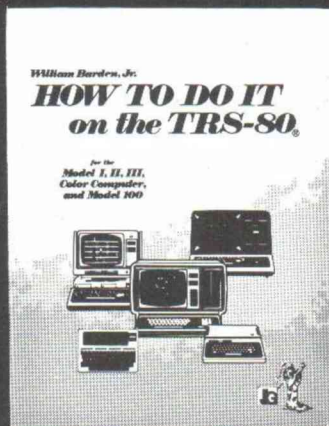
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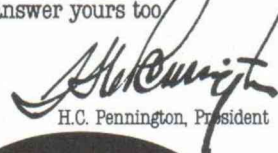
CompuThoughts

I can't begin to tell you everything about this book—it's unusual. The first things you notice about it are that it has no page numbers and the "table of contents" has over 2,000 entries in alphabetical order. Here's why:

We use TRS-80s—from accounting to typesetting. The variations of BASIC, applications software, hardware and operating systems is more than can be remembered. Nothing gets done when your nose is in a manual.

Why can't "they" make a book that has everything in one place? Hell's fire, "we" are "they!" I told Bill Barden that if he would write such a book I would do two things: 1) I'd publish it and 2) I would quit bitching.

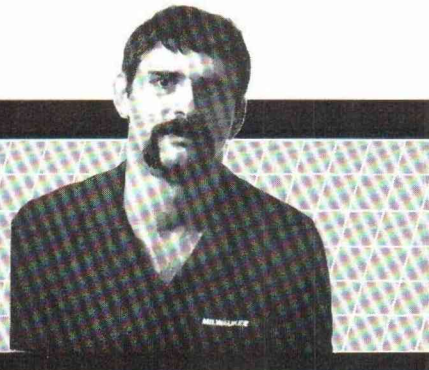
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PREVIEW



WE'RE BIGGER, BUT WE DON'T HAVE ENOUGH SPACE YET!

You might've noticed we've jumped to 72-pages this month (still small in a publishing segment where the average magazine exceeds 200 pages). Despite the increase, we couldn't find room for Gary Bender's second installment in his Better Basic series and our review of Paul Andreasen's Mikrocolor interface for the 100. My advertising director (the dude in the suit on the cover) assures me we'll have at least another eight pages next month so we should get everything we're supposed to get in with ease (I hope!).

Now that we've talked about what isn't in this issue, let's look at what is.

TRAVEL MASTER. About a dozen books will be published this year on the Model 100. One that we feel will be a winner is Osborne/McGraw-Hill's offering *The Model 100 Book: A Guide to Portable Computing* by Jonathan Erickson and Robert J. Sayre. We've received permission to reprint three chapters from Jon and Bob's book, and we think once you take a look at them, you'll understand why we're predicting success for the duo.

Jon and Bob's first installment is Travel Master (page 28). Do you have difficulty keeping track of appointments? Do you come home from a business trip with your expenses written on paper napkins and matchbook covers? Travel Master can clean up your traveling act by letting your 100 track appointments and expenses. It will even print reports of those activities.

QUICK SORT. Ron Balonis says he likes a challenge and the Model 100

presented him with one; writing a machine-language sort program with almost no ROM documentation. Ron rose to the occasion and we think you'll enjoy his results starting on page 44.

STATS ANYONE? Skyline Marketing in Chicago has jumped into the Model 100 software market with both feet running. The firm received kudos in these pages (October 1983, page 17) for its PortaCalc software, and now Scott Norman says Skyline's statistical program and linear programming package, PortaStat and PortaMax, deserve similar accolades.

"Both of the new programs interface with PortaCalc files," Scott says, "although they can be used as stand-

alones. Both give the user the same sort of 'feel' in operation, as well." See what else Scott has to say on these programs starting on page 64.

TANDY 2000. For computerists whose sole contact with the Tandy Corporation was the epithet TRASH 80, the Model 100 was probably a stunning surprise. But, the hard core defilers countered after overcoming their initial surprise, Tandy didn't make the 100; the Japanese did. Basically, we're still dealing with that company putting out those *awful* battleship gray boxes.

Well, we can't wait to hear from the trash-Tandy crowd after they get a look at the Tandy 2000. This is a *machine*. Read about its introduction at COMDEX on page 14.

Speaking of COMDEX, the show of computer shows was bigger than ever this year, but was it better? Has IBM changed the scene forever? Take a look at what some observers on the Source had to say on the festivities starting on page 17.

COLUMNS. Bill Walters has a potpourri of information for you this month. Has your 100 ever locked-up on you? Bill outlines some common causes behind this happening. And what about the most common Basic program line number? It's 35ST. See why in Tandytalk on page 22.

CompuServe goes may have noticed some changes in the service's data bases. Bill Loudon explains some of the new commands in Telecomputing on page 24.

Jake Commander is on a tear this month. Someone mentioned 8085 mnemonics to him and the venom poured from his keyboard. See why Jake's so upset in Portable Commander on page 26.

And after that, take some time to improve your powers of recall with a David Busch game (page 32) called "Memory Stretcher."



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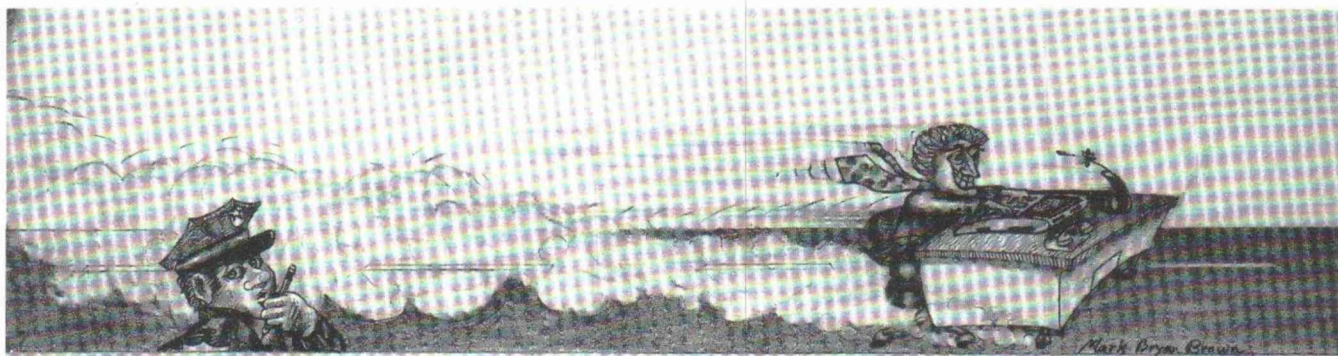
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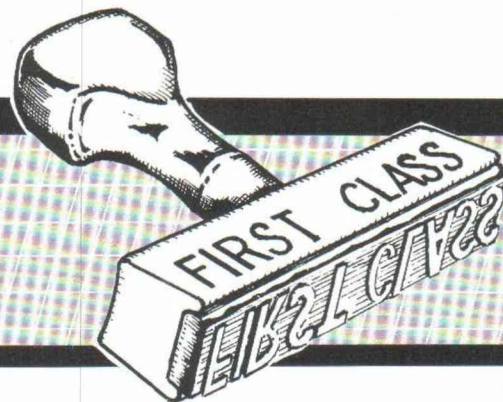
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MAIL 100



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SOME TIPS ON MAKING YOUR BASIC FASTER

One of the greatest computers ever created is the one I am using now to write this essay. Of course, it is our favorite baby, the Model 100. It has a number of features I have been used to for the past several years on larger commercial computers, i.e. a real-time interrupt driven clock, the interrupt structure itself, a type-a-head buffer, a device structured I/O, etc.

I could rhapsodize a great deal more, but all of us know what a great machine this is. With all, there are a number of shortcomings that exist as a result of creating a totally portable machine. The most aggravating of these is the shortage of memory.

For the last five years, I have been programming on a DEC PDP-11/03, which also suffers the same deficiency. As a consequence, I developed a number of strategies to cope with too much program in too little memory. In the process I also discovered methods of speeding things up a bit. Finally, I have uncovered a number of "features" unique to our own favorite that can be useful in programming this machine.

Every Basic keyword, quoted literal, and punctuation mark, occupies a byte in memory. Every line number uses two bytes for the number and a "null" byte that terminates each line. Each space takes a byte. Variables use a two-byte pointer to the area in memory that the variable is stored in. In addition, each type of variable uses different amounts of storage space. Integers

require two bytes; reals, four bytes; and double precision, eight bytes. Strings take one byte for each character and they are allocated dynamically. This is all background for the following space and time saving tips:

- All variables should be typed at the beginning of each program. Use DEFINT, DEFSTR, etc. Even string variables should be typed because the "\$" used with each such variable takes a byte of storage.
- Use integers wherever possible, especially in counting loops. The time savings is dramatic. Integers are 2½ times faster than the default of double-precision. Reals are only 25 percent faster than double precision.
- Eliminate the variable argument on the NEXT portion of For-Next loops. Here is a real kicker. Besides the saving of one byte of storage for each such occurrence, integers are 60 percent slower, reals are 50 percent slower, and double precision is 80 percent slower when you specify the variable than when you simply specify NEXT.
- Eliminate final quote marks on all literals that appear at the end of lines. A byte is saved for each.
- Another surprise that violates all I knew of previous Microsoft Basics is that semi-colons are *not* routinely needed as variable punctuation. They only seem to be required after PRINT USING or if you want to keep the cursor from advancing to a new line or in an INPUT statement. All other uses are gratuitous and can be left out to save one byte per occurrence.
- Use as many multiple statements per line as you can since for each line number eliminated, you have a net savings of two bytes (the three needed for each separate line less the one byte used for each ":").
- Eliminate all spaces. Your archival copy should have them for intelligibility, but your running copy will save one byte for each space that is removed.
- Put all initialization code at the end of your program and do a GOTO or a GOSUB. Little used routines at the end make for a dramatic improvement in speed since Basic must search from the beginning of the file for each line referenced.
- Put all time critical code at the beginning of the program for the same reason.
- Initialize all variables before you start the main body of code. This creates a stable, linear table of variables that are accessed more rapidly.
- Do not use the supposed short-cut of raising a number to the .5 power to save time over the SQR routine. Inaccuracies in the 11th and 12th decimal place might tend to screw up any further calculations in which you might use this result.
- Assign literals used more than once in a program to a variable. Do this in your initialization code. Almost one byte per character is saved for each such duplication eliminated.
- Use SPACE\$(X) to assign X number of spaces rather than STRING\$(X,32).
- Another surprise: use REM instead of " ". This saves two bytes per occurrence. Of course, you should remove all REM statements of both types from your running copy.

I hope these ramblings of mine will prove useful and will provoke other users to add to this document to the benefit of all of us.

Richard Horowitz
CIS ID 75735,677

100 vs NEC ...NO CONTEST

I've got a NEC 8201A, and it is quite a disappointment compared to the Model 100. In addition to some minor differences such as having the LOCATE command instead of the PRINT @, it has some serious deficiencies. There is a nasty bug in the conversion of single precision to double precision variables, which gives inaccurate results. You cannot use MID\$ on the left side of an = sign in an expression.

There is no LINE command. The INPUT command can cause some problems in a program if you have other information on the screen, as it seems to INPUT about 255 characters even if they aren't input directly from the keyboard. The cassette I/O is done at 600 baud, so program and data storage and retrieval are slow, and require more tape. The manuals are inferior to the one supplied with the Model 100. The "free" software supplied is not much good, except for the bank switching utilities. The case is pretty — beige

and brown — but it is painted color, not molded.

Two more quickies — no graphics characters, and it defaults to single precision in Basic.

Terry Haas
CIS ID 72135,1212

UPSET 100 USER WARNS, BUYER BEWARE

Recently, when I would start up my 100, garbage would appear on the screen and then the menu would come up normally. After a while, the menu took longer and longer to come up, and finally, the screen remained blank. Therefore, I took it to be fixed, and when I picked it up, I received a bill for \$127. I had not anticipated such an expense; they told me they had to replace the PC board.

My 100 has never been dropped or abused. I asked if the board was cracked; they said they didn't know. I asked them to find out why it was replaced; they didn't know and couldn't find out either.

Was I sold a bad 100? Was it a matter of time until it went bad? Why can't they tell me exactly what is wrong? Why didn't they call me before the repair work was started? Has anyone else run into similar problems?

Leonard Rivers
CIS ID 72126,1203

RICKY DON'T POKE THAT NUMBER

Here's a strange one I'd like to have explained to me.

I noticed my text files no longer displayed the triangle graphic where carriage return had been used. I didn't think much about it. Then, while creating a new text file, I suddenly started getting characters misplaced on the screen, lines would not wrap, screen did not scroll. And finally, of course, I got a complete lock-up. (My first one in seven months.) After a brief requiem for about 20K of data and programs, I went to a cold start and got my computer back, complete with triangles where I'm used to seeing them.

Now for the strange part. I decided to scan the file directory on the off chance something had survived, nothing had. After Suzuki and Hayashi, I found a directory entry for "Ricky", file type byte 72, address 0. I want to

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know who Ricky is, and why he wanted to trash my machine. Any ideas? Thanks.

Martin Lowy
CIS ID 75515,662

In the December 1983 issue of *80 Micro* there is a Model 100 memory map. It's a pretty detailed one and claims that Suzuki represents the address of a Basic program that hasn't been saved to RAM under a file name yet, and Hayashi points to end of documents. Perhaps "Ricky" stands for some other important location in RAM?

Dave Cloutier
75755,104

This may be wrong, but I think Ricky occupies the directory entry position that is used when you edit a Basic file. When a Basic program is edited, the system creates a .Do file with the same name as the .Ba file. Ricky will be written over after this takes place.

Greg Susong
CIS ID 70635,1312

HAS OWN VERSION OF WRITE+ AFTER TINKERING

For the last couple of months I have been using the Write+ Version 2.0 word processing program from Portable Computer Support Group (PCSG). I find it a fine program, capable of formatting any variety of printed matter. (At least all of the different kinds of formats that I have wanted.) No basic complaint from me.

After developing a group of "favorite" formats, however, I found I had a problem. I could only put one in RAM at a time if I named them all "W+SPEC". Of course, there is the option of performing a name change each time I used one of the variety. Being basically a very lazy person, that did not seem a reasonable thing to do. The only option acceptable to me was a modification of the WRITE+ program that would allow me to name my format specification files by any name that pleased me.

Two approaches occurred to me. One was to perform the name change within the WRITE+ program. This worked okay but it had problems. If, by any chance, I had a "W+SPEC file

by that name in RAM, I would get a "Bad File Name" error. I also found that if I interrupted the program after naming the new specification file, I would come up with an "Illegal Function Call" if I tried to cleverly name the file the name it already had. Hence, the second approach.

The option I finally settled on entails a modification which allows the user to name the specification file. The program sees no need to rename the file: Any name that answers the requirements of the Model 100 "TEXT"

name requirements is okay.

The modification entails the addition of a statement that asks for the specification file name. I chose to implement this by adding to line 5 and by adding a new line 70. These lines now read:

```
5 KEYOFF:CLS:F$="":FILES:GOSUB
70:A$="Which file to print":GO
SUB46:INPUT$:IF F$="MENU"OR
IFF$="":THEN 35 ELSE F1$=F$:KEY
ON:CN=0:GOSUB49
70 PRINT:PRINT:INPUT "What spec file
is to be used";SF$:RETURN
```

THE CASE



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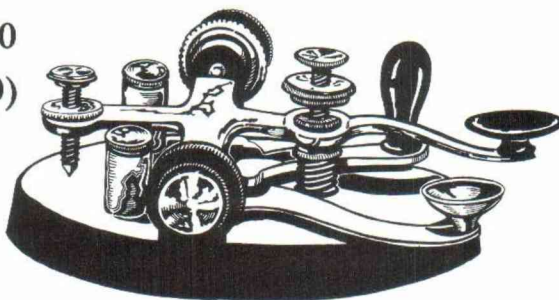
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Well, that works well, but I found the program is still looking for the W+SPEC file to use for formatting. Line 51 has to be changed by making F\$= "W+SPEC.DO": read F\$=SF\$:

The next change is not necessary; it is only a cosmetic touch. So as to rid ourselves of all references to the special name, "W+SPEC", I chose to make this final change in line 54. This merely changes the specific "W+SPEC" to the general "specification". Change A\$= "Bad W+SPEC file":GOSUB48:RESUME35 to A\$= "Bad specification file":GOSUB48:RESUME35

That's all there is to it.

I have discussed these changes with PCSG and they encouraged me to make these changes public. They also asked if they could use these solutions to help other customers of theirs. My answer to that is an emphatic, YES. Should any user of these suggestions wish to make comments to me — or to further improve upon these suggestions, I may be reached on CompuServe.

Happy formatting:

F.W. Harland
Wichita, KS
CIS ID 75665,1713

▲ The Portable Computer Support Group has contacted *Portable 100* and said there must have been a misunderstanding between it and Mr. Harland. The makers of Write+ neither encourage nor recommend the changes he has suggested in his letter. We would suggest to our readers that experiments on commercial programs should be conducted on *backups* and not original copies of software.

—Eds.

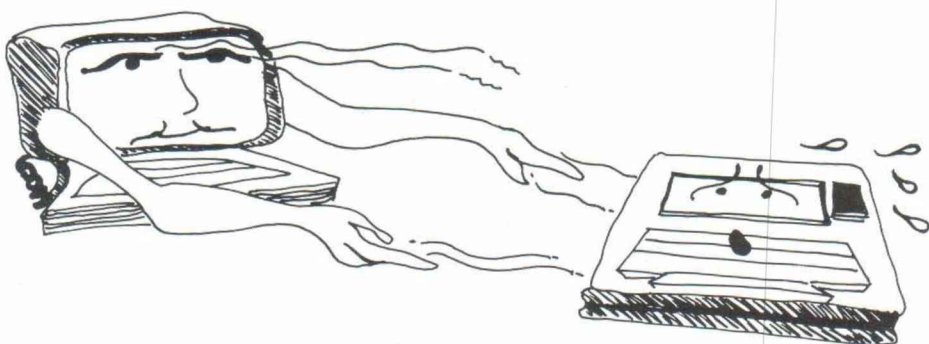
PORTAPRINT'S CONTROL CODE FORMATTER, HARBORING BUGS

PortaPrint's Control Code formatter has definite bugs that I have tested carefully on two totally different printers: Prowriter and CGP-115.

It is not possible to use the caret symbol for any purpose other than PortaPrint's three purposes.

Centering is not reliable. With three line feeds between "Sincerely" and "David" the name was generally printed five spaces to the left of "Sincerely."

TAB and CTRL-I do not give the same result, as they should.



Use of the caret will consistently result in the loss of the character following it and an immediate linefeed and carriage return.

Anyone owning a PortaPrint should run this message; you will see what I mean.

^ Dave ^

25 ^ 10*36 ^ 13

I don't think mathematicians and engineers would like that.

Dave Thomas
CIS ID 70526,1117

A WORD ON RANDOM ACCESS AND CASSETTES

My eye was caught by a couple of things in your letters section last month.

In response to James Swan's point about random access to records within a file. Direct or random access requires that all records be the same length. In their pursuit of simplicity, the ROM writers decided to support the more versatile, but slower, sequential file structure. It is possible to make a file pseudo-random, however, by ensuring that each record delimited by a carriage return is the same length. PUT+ from Portable Computer Support Group does this, but does not address the related problem of random retrieval and update. Our new program, DATA+ does, however, as well as performing

several other sophisticated functions, including merging (into form letters, for instance), and listing only certain records.

The point about the high-order byte coming before the low-order byte is worth clarifying. This is the standard "byte reversed" method of storing word values and is by no means unique to the Model 100.

On another tack, does Bill Walters have a special ROM in his beautiful golden computer? Whenever I try using the line:

50@STOP

on mine, I get a ?SN ERROR IN 50!

On yet another front, thank you Don Watson for the fine article on cassette technique. We at PCSG have discovered one or two things worth passing on in this vein. First, CRT's seem to have a destructive effect on the recording process. If we have the computer, the cable, or the recorder near an active CRT we run into problems. Secondly, the 100 seems to run into less errors reading TEXT rather than tokenized (BASIC) files, this may be because they are blocked. It takes longer, but if you save an extra copy of your program with the "A" option, you'll have a more reliable backup.

Second, after several uses, a tape needs to be run through a "bulk eraser", then can be re-used. This is just a strong electro-magnet.

Keep up the fine magazine, and we'll wait for our new issue every month.

Michael Stanford
Portable Computer Support Group
Dallas, TX

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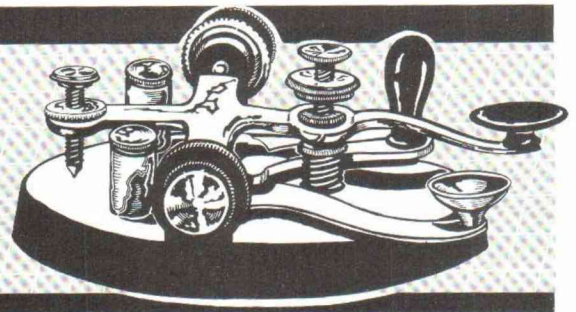
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THE WIRE



TANDY

TANDY'S NEW 2K: THE KEY WORD IS LEVERAGE

Market leverage played an important role in Tandy's release of its new "ultra-high-performance" TRS-80 Model 2000 MS-DOS-based microcomputer. And it will play an important

role in insuring Tandy is a "survivor," not a casualty, in any shakeout of the microcomputer industry.

Those were the sentiments of Tandy Chairman John V. Roach expressed at

the unveiling of the 2000 at COMDEX last November.

The latest Tandy product is not a "me-too" computer, Roach said in a statement. He declared the 2000 is a "superior new generation product that represents one of several steps we plan to take to leverage off of this standardization trend without becoming vulnerable to other manufacturer's strategies."

The Fort Worth, TX, firm expects the Tandy 2000 (the

name Radio Shack is conspicuously absent from the identity of the machine) to add a new dimension to its microcomputer product line with its next-generation processor and strong price/performance ratio.

Tandy authorities describe the 2000 as almost three times faster than other MS-DOS-based systems currently in the marketplace. Powered by the Intel 80186 microprocessor, with full 16-bit data path, they claim

Compare the Price of Model 2000 to Other MS™-DOS Based Computers

Price Comparison	TRS-80® Model 2000	IBM® Personal Computer	Texas Instruments®	COMPAQ™
Basic Price (Floppy Version)	\$2750	\$2104	\$2195	\$2995
2nd Drive	Included (720K)	\$529 (320K)	\$475 (320K)	\$595 (320K)
Monochrome Monitor	\$249	\$345	Included	Included (9")
Display Adapter	Included	\$335	Included	Included
Upgrade to 128K RAM	Included	\$165	\$300	Included
RS-232	Included	\$120	\$225	\$145
MSDOS 2.0	Included	\$60	\$60	\$60
Printer Interface	Included	Option	Included	Included
System Total	\$2999	\$3658	\$3255	\$3795
Basic Price (Hard Disk Version)	\$4250	\$4995	\$4690	\$4995
Drive Capacity	10mb	10mb	5mb	10mb
Monochrome Monitor	\$249	\$345	Included	Included
Display Adapter	Included	\$335	Included	Included
256K RAM (TOTAL)	Included	\$330	\$600	\$320
Floppy Disk	720K (1 Drive)	360K (1 Drive)	320K (1 Drive)	360K (1 Drive)
MSDOS	Included	\$60	\$40	Included
RS-232	Included	Included	\$225	\$145
System Total	\$4499	\$6065	\$5555	\$5460

Manufacturer's Suggested Retail Price-COMPAQ 1/1/1983, TI 7/1/1983, IBM 9/1/1983

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The MIKROKOLOR Color Graphics Interface is designed to provide the new TRS-80* Model 100 portable computer with high resolution color graphics and text capability, utilizing a standard color television or color monitor. The MIKROKOLOR provides 256 x 192 color graphics, with 15 colors plus transparent. Its 3 dimensional Sprite planes provide for simultaneous display of all levels. It has four modes of operation available.

1. Test mode: Provides 24 lines of 40 characters each using a 6 x 8 dot matrix, and provides 256 user defineable characters.
2. Multicolor mode: Provides 64 x 48 color graphics.
3. Graphics 1 mode: Provides 256 x 192 color graphics, 24 lines of 32 characters each, utilizing an 8 x 8 dot matrix, with 2 colors per character.
4. Graphics 2 mode: Provides the same as Graphics 1 mode, except allows 16 colors per character.

Sprites are prioritized 3-D slide planes, 32 in all, capable of displaying 15 colors plus transparent. This allows easily programmed graphics animation capability for use with business displays, graphs, charts or games. Unit provides Composite Video output for use with any color television when employed with a modulator, or by direct connection to a color monitor. Use with a black & white television or monitor allows 16 gray levels to be used instead of colors. No hardware modification is necessary to your set, as the unit plugs into the existing buss expansion socket. The Texas Instruments TMS9918A Video Display Processor uses no memory from your set, it has it's own on board RAM. Other models supported are S-100, TRS-80 Models I, III, 4 and 12 and Apple II. For information on use with other models, send complete buss information and method of addressing with a large SASE to our technical department, P.O. Box 5686, Vandenberg, California 93437. Bare boards are also available for universal adaptation to almost any 8 bit system.

The Model 100 Mikrokolor will come complete with manual containing sample programs. Also available will be a text translation program that will provide full screen text capabilities of 24 lines of 40 characters a line, with full cursor and scroll functions. VHF Modulators are available also at \$54.00 including cable (powered by Mikrokolor unit). These operate on channels 7-10 VHF.

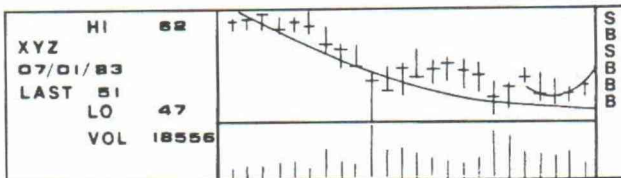
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See cover article to 80 Micro, May '83 for additional info.

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THE WIRE

it has twice the storage found on competitors' disk drives, twice the color resolution (640 by 400), and twice as many colors (8).

The bottom line, Tandy maintains, is the price: \$2750 for the 2000; \$3658 for the IBM.

The latest in advanced MS-DOS-based software will run on the 2000. A few of the compatible programs are: Microsoft's Windows program; Ovation, a new innovative integrated spread sheet, graphics, and word-processing package; the MAI/Basic Four integrated Accounting Series; and the MultiMate word-processing program. The MS-DOS operating system also will enable users to run specialized application software developed for MS-DOS machines.

In another statement released by Tandy, Don White, product manager for the 2000, said in a sample of about 100 programs, one half ran once copied on the 2000. "Those which bypassed the MS-DOS conventions and directly addressed the hardware did not run," he explained.

Dr. John D. Patterson, Tandy's vice president of research and development, added:

"The significant enhancements of three times the speed, twice the disk capacity, and twice the display resolution, makes it impossible to run IBM PC application software that makes direct interface hardware — even though the 8088 instruction set is executable.

"The amount of changes required in an applications program has been minimized by using MS-DOS with compatible system calls and bios entry points consistent with the IBM PC.

"The result is that hardware-independent PC soft-

ware that interfaces exclusively with the DOS and bios will run directly on the Tandy 2000."

The Tandy 2000 is a sleek machine, with detachable, low-profile keyboard and optional "mouse". It's available in two configurations, both expandable to 768K of internal memory. A basic Tandy 2000 System (catalog no. 26-5103) with 128K RAM and two 5-1/4-inch floppy disk drives totalling 1.4 megabytes of storage is priced at \$2750.

A Tandy 2000 hard disk system (26-5104) with a single floppy disk drive, 256K RAM and built-in 10-megabyte hard disk is \$4250.

Both a VM-1 high-resolution monochrome monitor (26-5111, \$249) with 12-inch, non-glare 80-by-25 green phosphor screen, and a CM-1 high-resolution color monitor (26-5112, \$799) with vivid 14-inch screen are available. Optional 640-by-400 high resolution graphics are available for either monitor.

The system's VM-1 monochrome display can be placed on an optional monitor pedestal (26-5115, \$89.95) that swivels and tilts to provide an optimum viewing angle. An optional floor stand (26-5116, \$145) allows the CPU to be placed beside or under a desk, resulting in the smallest possible "footprint". In the standard desktop configuration, the keyboard slides under the computer when not in use so that more desktop space is available.

With IBM-PC compatibility increasingly becoming a prerequisite for survival in the microcomputer market, release of the 2000 could be Tandy's statement on its future expectations. In the year 2000, it may be telling competitors, it plans to still be here.

COMDEX

VIEW OF SHOW OF SHOWS
BETTER FROM SIDELINES

By Nancy L. Laite

For those of you unable to attend COMDEX '83 in Las Vegas, quit feeling sorry for yourselves. According to several conference-goers reporting via The Source's Participate service, the hugeness of the show was overwhelming — like watching an NFL game from the grandstand when you know the best seat is in front of your television.

Of course, everyone was talking about IBM's PC Jr., or the Peanut, housed in its own exhibit hall. With a reservation, attendees were able to have hands-on experience. The consensus, however, was IBM had better send Jr.'s keyboard back to the design department.

Describing the keyboard as "horrible, with rubber domed chicklet keys," Steve Caswell said he could develop no typing speed at all. "Fortunately," he continued, "it is a flaw that can be fixed ... which the aftermarket will provide very soon, unless IBM swallows [its] pride."

He said IBM's marketing of Jr. was "the biggest bill of goods since the emperor's new clothes."

As a \$669 computer to play games with, it is useless, he maintained. He added, "You may as well buy a VIC-20 if all you want is games."

Caswell said buyers would have to spend closer to \$1269 for a disk, plus another couple of hundred dollars for a printer, in order to do serious word processing on Jr.

Although COMDEX-goers found fault with Jr., they had only kudos for

IBM's exhibit. "It was really an impressive marketing-strategic feat," remarked Greenly, who filed his reports on The Source with his Model 100. "...the IBM influence is everywhere. People tell me that last year you could feel the rise of IBM. This year there's nothing to feel ... people are knocking themselves out to be IBM compatible."

Besides the prevalence of IBM influence, a second theme at COMDEX '83 was windows. The phrase "windows onto knowledge" was circulating the show as people wandered from booth to booth, examining this new software. Steve Gibson told fellow Source conferees: COMDEX should have been called WINDEX!

As Gibson described it, windows "divide your video screen into many pieces, and an application program (i.e. spreadsheet, word processor, graphing system, etc.) is assigned to each. There are ... controls for moving data from one window to another, thereby moving data from one application to another. Windows thus form the integrating mechanism for otherwise un-integrated programs. ... If anything, windows of any sort are the most exciting thing to happen to operating systems in years."

In the IBM PC arena, the two window heavyweights are Microsoft and Visicorp. Gibson analyzed the contest between the two:

Microsoft's approach "is to add another layer of software between the MS-DOS application and the operat-

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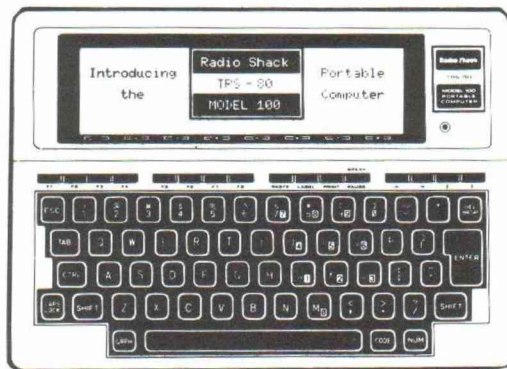
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MICRO-PILOT #MP1 \$ 28.00

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THE WIRE

ing system. Given that the application is well-behaved, (i.e., it does all screen output through system calls and not by writing directly to the screen) any existing MS-DOS application will operate within windows. This is not the case for operation under the umbrella of VisiOn."

Not surprising, Gibson noted, when one considers "Microsoft, being the father of MS-DOS and PC-DOS, can extend the OS interface downward toward the application, while VisiCorp has no guarantee that Microsoft would not move to disconnect it in the future if VisiOn did the same. This means that future software vendors will need to support VisiOn by writing their applications for the VisiOn environment."

But, he went on to say, "while Microsoft has an impressive list of supporters, Microsoft lacks IBM endorsement ... which VisiCorp has!"

VisiOn's approach, Gibson explained, is to "emulate Alan Kay's Smalltalk and the Lisa The result is that Microsoft makes it a bit easier to be using all of your limited display area while sacrificing a bit of the overlapping window ... which VisiOn tries to maintain. Once you've grown tired trying for the Lisa-look on your lower-resolution tube, you probably will opt for the more efficient and less flashy Microsoft presentation."

Microsoft is really in the driver's seat, he argued, because it is the father of MS-DOS. He said VisiCorp will have to attempt to create a sub-operating system and get manufacturers to write applications for it. As Gibson sees the contest, "[a]t this moment, there are apparently more [machines]

operating in the VisiOn environment than in the Microsoft world ... but that's today."

Not to be outdone by IBM, Tandy Corporation introduced a new computer during the show (see page 14). The TRS-80 Model 2000, described by the *New York Times* as "a machine designed to be competitively priced with IBM's personal computer," nearly compatible, and offers 128K of standard internal memory. Greenly compared the two, saying the Tandy 2000 has a "720K capacity per disk drive, faster clock speed than the IBM PC, ... color resolution of 640-by-400 versus IBM's 320-by-200, eight colors versus IBM's four, and priced at \$2750 versus IBM's \$3658.

Other company product releases, as surveyed and commented on by Greenly, included:

- Pro-Dos — which allows the Apple II family to take advantage of the 5 megabyte Apple hard disk "Profile."

- RanaSystem's 2.5 floppy disk system — expensive at \$1795, but it allows you to turn your Apple into an IBM with two disk drives.

- TI's Voice-activated computers appear to be an idea that "was great at the time but is that all there is?" Much ado about nothing; the real advances for talking computers will come from the Japanese.

- Peachtree's package — five useful capabilities (word processing, thesaurus, spelling checker, spreadsheet, and telecommunications) make it a bargain" ... all for \$395 and IBM compatible. Its use of an artificial voice to supplement its visuals puts it way ahead.

THE WIRE

• Hewlett-Packard's touch screen machine — better than expected and can see how it will work its way into an office setting a lot faster than TI-Voice.

• ITT — "ITT thinks it is going to dominate the market by having an IBM-compatible machine at 5 percent less."

• AT&T — as some of you may have heard, is expected to announce several personal computers which have been based on their Bellmac 32 processor. AT&T may be the only company to give IBM a run for their money.

• DESQ — (pronounced "desk") has a striking, if useless feature ... overlapping color. At the moment, they appear to have a handle on windows, but it will be no contest for Microsoft and VisiCorp in this department.

• Apricot — Britain's answer for small American businesses and professionals who are single users. Weighing in at 17.5 pounds, it just misses the portable category. An IBM PC emulator package enables the micro to run 85 percent of the PC's written programs. It sells for \$3100.

For COMDEX veterans, there was a feeling of nostalgia and loss, Greenly reported.

"Some of the old hands I talked to," he said, "kept remarking how *big* COMDEX is and how different some of today's vendors are from the early pioneers.

"They remembered the old days when most of the people came to the fair in jeans and boots and funky sweaters or western shirts.

"Now IBM has changed the ballpark forever. With the many dark suits and white shirts at the current COMDEX, you could assemble an usher's convention in a jiffy.

"These people I heard from remember when most of the visitors to such a fair were — on the average — *much* more technically proficient and knowledgeable than the people who now attend.

"The computer business has expanded. And some people today get into it because they say to themselves, 'Hey, I can make a lot of money with that stuff' as opposed to 'Boy, do I love this stuff.'"

Computers are a fragile market. And with big boys like IBM getting into things, some of the little guys aren't going to get a chance. Steve Deering remarked, "The most disappointing thing to me is that there is some really very, very, superior equipment out there that will not be here next year because of IBM.

Greenly added: "People keep pointing out that one-third of the exhibitors will be out of business by next year, so there's a certain poignance in the vastness of the exhibit halls and amounts of money, heart, and caring that went into producing the fair.

"Even people's products I've been hard on in this summary have a dignity — I feel it, at least — that comes from all the intelligence and muscle that went into them.

"It's just so clear at a fair like this how tumultuous the market is and how important it is to have the *right* product at the *right* time and say the *right* things about it. That's not new — it's true of cars or detergent — but it's truer here for sure." ❖

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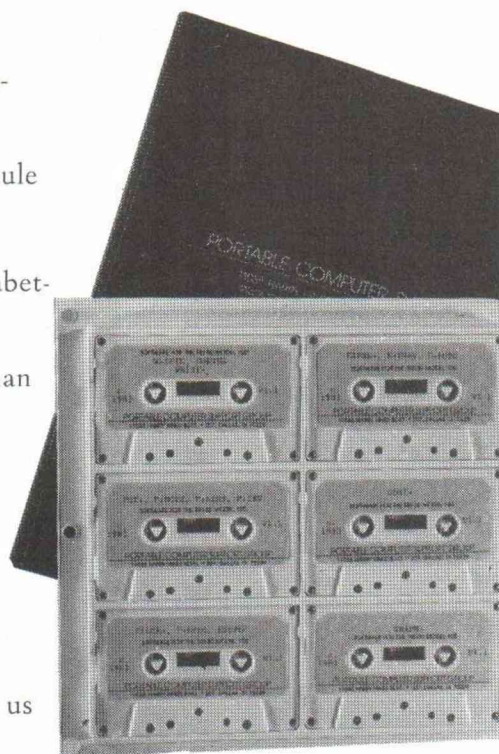
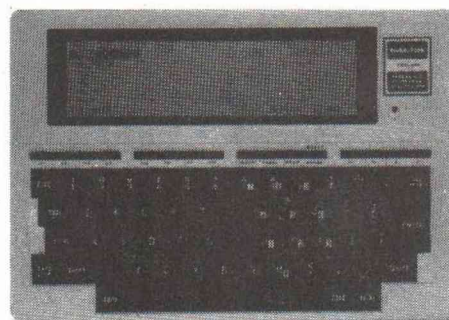
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TANDY TALK



SOFTWARE, COMMON SNAFUS, A WARNING ABOUT RESET, AND A FOUR-STAR CSAVE TIP

I have to say I'm delighted by all the software and accessories showing up for the Model 100. So far, from third-party suppliers I've counted over 40 software packages, a color video interface, and even a battery-powered, wafer-tape, storage device.

Some folks ask, "Hey, how come Radio Shack hasn't brought out some of these items?" As nice as some of the items are, the answer is, we just can't do everything, and the things we are doing can't all be done at once. Yes, we do intend to provide other products, both hardware and software, to support the 100.

TANDY SOFTWARE. You can take a look at our flyer for this month and see seven software packages listed. Four were previously listed in our computer catalog and three are "surprises." They are the following:

- Basic Language Lab;
- Investment Analysis;
- Statistics;
- Math Plotter;
- Executive Calendar;
- Personal Finance; and
- Calculator.

They range in price from \$19.95 to \$69.95 and *should* be available in our stores now.

Not all packages will be stocked in all stores, but any item can be ordered and will be promptly shipped to your store. End of commercial.

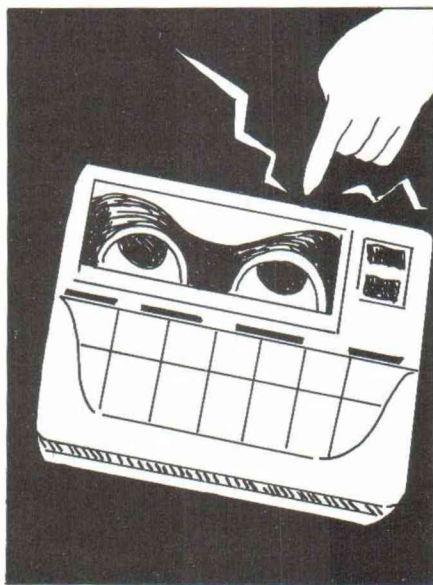
LOCK UP. I often browse the Compu-Serve SIGs (Special Interest Groups) and pick up a lot of questions. Some of

them are often asked at our stores, too, so I thought I'd pass on some tips to help you with your 100.

First, computer lock-up. No, this doesn't mean your 100 goes directly to jail and doesn't pass go or collect \$200! I'm referring to the *most common* source of complaint from new owners. They pick up their 100, turn it on, and can't get it to do anything except stare at the main menu. Even the clock isn't working! Cycling the unit off and on doesn't help either. Obvious, right? It's totally "bombed out."

Relax. It's not as bad as you thought. Press shift-break. You should hear a beep and see your clock start ticking again. What happened was you accidentally pressed the print key.

Your 100 was dutifully trying to dump the LCD to the printer. The only problem was, your printer was either disconnected or turned off.



MAD BEEPER. Not the paging kind either. Symptom: 100 sitting idle at the main menu. You pick it up, press a key or two, and voila! The beeper goes off like mad and the unit is "locked up". This isn't like the case above either, since the machine is doing *something*. You can't get it to stop. Finally, it quits and you notice some stray letters on the bottom line next to "Select:." Did you figure it out? Think a second or two before peeking at the answer.

Give up? Or did you get it? The key pressed accidentally this time was paste. It "pasted" the contents of the paste buffer on the file-select line. Solution? Press shift-break. Remember, the command keys operate as labeled across all of the built-in applications. No matter where you are, TEXT, TEL-COM, BASIC, SCHEDL or ADDRSS, if you press the paste key, you're going to begin seeing all the text saved in the paste buffer.

35ST. The most famous Basic program line number! I'd be rich if I had a penny for each time I pulled my 100 out of its case, flicked it on, cursoried over to a Basic program, pressed enter, break, and typed list... almost. Instead of list, I typed 35ST—or list with the number lock on.

Well, I don't have any magic answer for this one, except to say no Radio Shack program has a line 35 in it.

RESET BUTTON. This is one button that really should have been positioned deeper into the rear of the cabinet. The reset key need never be pressed unless the 100 becomes possessed by a "gremlin".

Other than machines with untested machine-language programs, I have seen only *one* unit unexplainedly locked up. That unit, of course, happened to belong to Tandy's chairman of the board.

I've been working daily with the 100

for over a year and I haven't needed to press the reset button due to any fault other than one already mentioned. If there's a reason for the reset button, well, I guess we were just a little cautious. It isn't necessary on the 100 and can be potentially dangerous to the integrity of its RAM files. If you have the habit of pressing the reset button to restart your Basic programs or as a "quick" way back to the main menu, you should change your habits.

CASSETTE I/O ERRORS. There is nothing more frustrating than being unable to reload a file saved to cassette tape. Countless articles have stressed the essentials to obtain the most reliable data storage on cassettes. Briefly, those are:

- Clean recording/playback heads;
- Quality cassette tape; and
- A steady power source.

In the 100 there is one wrinkle absent from our other computers: *sound*.

The 100 uses a technique for making and reading cassettes called "bit-banging". That means the central processor unit (CPU) does all the work of timing, sending, and decoding the pulses from the cassette circuit. In the "old" days the many support circuits to accomplish parallel to serial data conversion were expensive. Quite frankly, the CPU was very under-utilized and since it wasn't doing anything anyway, why not have it perform the parallel to serial conversion and save all that extra cost? Plus, the whole process would be under software control! It worked like a charm. The only problem was, since the CPU is in a fairly tight timing loop, testing the cassette port for a pulse, it doesn't have much time to do anything else.

Enter the SOUND ON and SOUND OFF commands on the 100. With SOUND ON, the CPU has to determine if a pulse is coming from the cassette port and if it's a one or a zero, then leave its cassette-read duties and pulse the piezo buzzer so you can hear the tape loading. When the CPU returns, a small interval of time has lapsed. *Sometimes* this lapse can cause an error in your read operation. The cure? If you're having trouble loading a tape, try SOUND OFF. It makes the CPU pay attention to the important task at hand. 🍷

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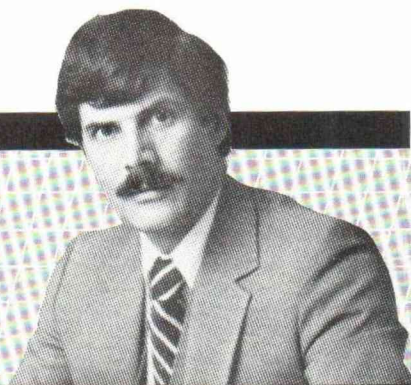
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Circle No. 21 on Reader Service Card

TELECOMPUTING



HOW TO ACCESS DATA BASES FOR COMPUERVE'S SPECIAL INTEREST GROUPS

One of the more powerful features of CompuServe is the large amount of public-domain software and information available to users for their personal use. Every Special Interest Group (SIG) has XA data bases containing programs any user can examine and download.

The Model 100 SIG, for example, has over 3 million characters reserved for its data bases.

To enter the Model 100 SIG/Access area, enter GO PCS-154. Once in the SIG, enter XA. You will be prompted for the data base number you wish to access. Choose zero. You will receive the menu in figure one.

If you need help enter 4 or ? for additional help. You may enter "? command" at most prompts for help on that command. Now let's look at each command.

BROWSE. The BROWse command is the easy way to scan the data base. It will take you through each item automatically. It forces a /des (description) option, and pauses after each file to give you a chance to Read or DOWNload the file. To return to the menu level, enter a T at the prompt.

When you select BROWse from the menu, you receive two additional prompts: /AGE: and /KEY:. Age allows you to specify the age of the files you wish to view. If you enter a 10, you would see files 10 days old or less. KEY allows you to specify the key words required in all files that you wish to browse. For example, entering 10 for age and enter for key would provide the listing in figure 2.

This would tell you CompuServe

User 70007,1365 has submitted a file named EMADOC.EJ; it is 2350 characters long and 23 users have accessed the program.

UPLOAD. The UPLoad command, is for transferring a file from your Model 100 into the data base. The for-

```
XA 0 - Text :
1 BRO Browse thru files
2 UPL Upload a new file
3 EXI Exit to Model 100 SIG
4 HEL Help
5 XA Change data base
Key digit:
/AGE:
/Key:
```

Figure 1.

```
XA 0: UPL TEST.EXT
Keywords:
Test Model-100
Description (500 chars max, blank line when finished):
This is a test
(At this point, the information entered will be redisplayed so you may
verify it.)
Keywords: TEST MODEL-100
This is a test
Is this okay (Y or N)? y
```

Figure 2.

```
[70007,1365]
EMADOC.EJ 27-Nov-83 2350 23
Keywords: DOCUMENTATION AUTOMATIC EMAILR EMAIL
Documentation for EMAILR.EJ, Modified version of Sandy Trevor's
EMAILR.100, describing differences from the original program.
Disposition:
1 R Read this file
2 D Download this file
3 T Top Access menu
Key digit or ENTER for next:
```

Figure 3.

mat is: UPL FILENM.EXT; where FILENM.EXT is the name of the file for the data base. FILENM can be a maximum of six characters and EXT can be a maximum of three characters. After entering the UPL command, you will be prompted for some additional information.

First, you will be prompted for a list of "keywords." These help users find your file with the scan command. Don't use obscure and inconsistent keywords. They will hinder users trying to locate your file. For example, if you are submitting an adventure-type game written in Microsoft Basic, you might use the keywords "adventure, game, mbasic." If the program uses graphics on the TRS-80, you might use "TRS-80, basic, graphics." In general, keywords should describe the file's content and not used as a title.

After entering your keywords, you will be asked for a short description of your file. You will be limited to about

500 characters, or nearly a full 32-by-16 page.

SYSOP ACTION. The sysops of the Model 100 Sig may change your keywords to be more consistent with their organization of the Sig. They may also move the file to another XA section if it was uploaded into the wrong one.

Since the Model 100 does not support the CompuServe B Protocol file transfer, your file must be uploaded manually using the UPL command in TELCOM. A typical UPLoad will look like figure 3.

When you're uploading a program, Access will attempt to interrogate your Model 100 to see if it is using a CompuServe protocol. Since the Model 100 is not, this test will fail and the message "No error detection protocol in use. Do you wish to be prompted for each line?" will be displayed on your screen. Entering "no" will upload the file the quickest, if your TELCOM STAT function has XON enabled.

Next, you will receive the message, "Begin sending your data. Use a control-Z (1A hex, 032 octal) to indicate the end of your data." Press F3 on your Model 100 and enter the file name you wish to upload. The width may be any number less than 132 characters. After the file is uploaded, enter a control-Z to end the UPLoad process.

EXTS TO AVOID. Avoid using the extensions .BIN and .IMG. These two extensions are reserved for B Protocol file transfers. .BIN is used for "binary" (8-bit) data. .IMG is used for "image" data. Image data is similar to binary, except it carries an identification of the kind of computer from which it came.

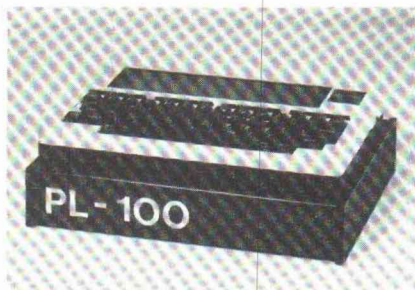
The remaining commands are EXIt and XA. The EXIt command will return you to the Model 100 Sig. The XA command allows you to change to a different data base.

Once accustomed to how the XAs work, you will want to stop using the menus. You do that by entering "SET NO MENU." Now you're in the command mode and a veteran SIGer. ▼

Bill Loudon is the product manager for personal computer services for the CompuServe Information Service. He sponsors the Model 100 SIG on CIS.

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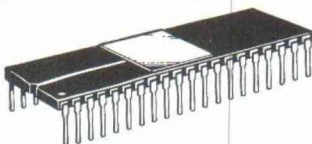
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PORTABLE COMMANDER



LOCK UP THOSE 8085 MNEMONIC WRITERS AND THROW AWAY THE KEY

In the beginning, you take possession of your Model 100 and — if you intend to actively program it — delve into Basic. Fortunately you're likely to have an easy time of this task. MicroSoft Basic is now probably more of a standard than the original Dartmouth Basic — something we can thank mass-marketing for. So, beginner or otherwise, you'll be using a lingo not only understood by your Model 100 but by literally dozens and dozens of other microcomputers.

Things are a little different for the programmer who wants to delve into machine-code programming. Gobbledygook becomes the lingo at this level. If you've never entered the hallowed realms of assembly language, you probably think it all looks like gobbledygook anyway. However, in most "tongues" of machine code, common sense prevails and contained in the gobbledygook, there really is an easily decipherable flow of logic, that is, a program. Once you know what the central processing unit (CPU) can do, the endless lines of code are able to tell you as much (or as little) as a Basic program.

M.C. BOFFINS. So far so good. All you have to do is learn Basic and you're a Basic programmer. All you have to do is learn machine code and you're an assembly language programmer. Life should be so simple. Now, on behalf of the many machine code boffins, I'll sidle up to my point.

Hey Intel, which crazed, perverted annihilator of the English language put your mnemonics together?

This may not mean much to the Basic programmer, so let me explain. As you've probably been told so many

times (and are about to be again), Basic stands for Beginners' All-purpose Symbolic Instruction Code. (It must have taken Kemeny and Kurtz *ages* to make Basic stand for something.) An important word in that acronym is "symbolic". Each word in Basic symbolizes the function it's supposed to perform. So, for instance, PRINT makes sense whether it prints on the screen, a line printer, or even a cassette tape. It's *symbolic* of its purpose within the Basic language.

NUMBER CHEWER. Things are supposed to be the same in assembly language. The difference arises because machine code works at a lower level than a Basic programmer. (Hence, Basic is called a "high-level" language.) In machine code, the CPU chews its way through millions of numbers telling it what to do next. Mostly, other numbers — the data — are manipulated within the CPU's internal registers to form results using the same logical flow that applies to a program in any language.

But what a pain! All those numbers just to tell a stupid lump of dopey silicon what to do. We machine-code programmers are such heroes! The pain obviously has to be alleviated somehow. Nobody in his right mind would stay sane for long programming day in day out by numbers. This may explain why machine-code programmers have sanities which could be described as "different". (I was nuts before I started.) There are just too many numerical CPU opcodes to remember. So nobody does.

The method of dealing directly with the CPU as described so far is pure machine-code programming. It is ex-

tremely error-prone and is more often used at the debugging stage than at the actual coding stage. This coding is done with the help of an assembler whose job is to allow the programmer to enter his code without having to know each and every numerical opcode. Instead of entering numbers into memory, the program enters opcode *names* into the assembler. These names are then assembled into the equivalent set of numbers which are finally written into memory prior to execution by the CPU. This is more accurately referred to as "assembly-language" rather than the more arcane and difficult "machine-code".

SYMBOLIC DUMP. The names of all the opcodes are usually chosen with great care by the manufacturer of the CPU. Care has to be used because hundreds — possibly thousands — of programmers will learn how to program their CPU via these names. For the same sensible reasons that apply to Basic words, the opcode names are chosen to be symbolic of their function. In fact, for this very reason, a dump of memory converting numbers into CPU opcode names (a disassembler) is sometimes referred to as a symbolic dump.

Unlike such all-encompassing words as PRINT or INPUT, assembly-language has to work in smaller steps obeying such instructions as "load the accumulator-register with the number one". The operation (or opcode) being performed here is "load the accumulator". So a name is chosen for this instruction telling the assembler to generate the right numbers. "Load the accumulator" takes up 20 characters — too long to be considered an instruction name, so it's contracted to something like "LDA". This shortened form isn't really a name any more. It's a mnemonic. My dictionary informs me that a mnemonic is a verse or form-

ula aiding the memory. We've now arrived at the reason why much of what you see as assembly-language code appears to be gobbledygook. It's all mnemonics.

The Model 100 is driven at the machine-code level by an 8085 microprocessor. This was designed by Intel Corporation as a minor upgrade to their highly successful 8080 and uses the same mnemonics. The same awful mnemonics. In 1976, Intel had the gall to actually copyright a set of mnemonics to accompany their chip's instruction set. Some people would copyright a heap of steaming cow manure if they thought it would make them a buck. And metaphorically speaking, that's just what Intel did.

Many machine-code programmers predating the microprocessor era were used to doing such things as loading the CPU registers and storing them somewhere useful. To load the accumulator with the number one, you would offer the assembler a line such as:

LDA #1

Then to store a number from the accumulator to memory location 1000 you would say something like:

STA 1000

It almost makes sense. It's almost not gobbledygook. A program written in such mnemonics is almost readable.

MOVE, NOT LOAD. Intel decided you didn't load numbers into registers like most programmers were used to — you *moved* numbers into registers. Oh well. Nothing like a bit of non-standardization to keep you on your toes. How does a MVI A,#1 grab you? It means "move immediate into the accumulator the number one". Oh boy.

What about returning from a subroutine? In Basic, this is RETURN — couldn't be simpler. In many dialects of assembly language (including unbelievably the 8085) the mnemonic is RET, also pretty simple and easy to remember. Sometimes in machine code you only want to return from a subroutine if the zero or perhaps the carry flag is set. So you say RET Z or RET C,

both logical extensions of the RET mnemonic. Not so with the 8085. Try RZ or RC — very readable, eh what? If I told you the Z80 mnemonic for "cancel subroutine if parity is even" is CALL PE, you might not be surprised by now to learn that Intel wants you to say CPE instead. What a rotten mnemonic. It could just as easily stand for "curtail processor execution".

As a last example, the good old Z80 refers to register pairs by using the names of both registers in the pair such as BC, DE, or HL. Intel had other ideas. They decided the register pair was an extended register called after the first register in the pair. So instead of a nice logical LD BC,#1 to load the BC pair with the number 1, you have to do a LXI B,#1. Spare me, please.

No wonder so many people who program their Model 100s in machine code actually use Z80 mnemonics. No wonder I see complaints about the readability of 8080 mnemonics. Whoever the Symbol Simon was who worked out those lousy Intel mnemonics, he ought to be locked up and the key quietly disposed of. ♣

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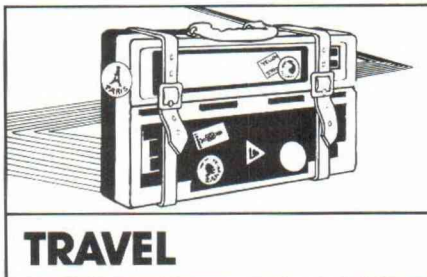
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MASTER YOUR DATES AND EXPENSES WITH TRAVEL MASTER

Next time you take to the road with your 100, take along this program to track your appointments and expenses.

By JOHN ERICKSON and ROBERT J. SAYRE

Editor's Note: This article is based on a chapter from The Model 100 Book: A Guide to Portable Computing by Jonathan Erickson and Robert J. Sayre, copyright © 1984 by Osborne/McGraw-Hill, used by permission of Osborne/McGraw-Hill.



Travel Master is a simple to use yet powerful tool for managing business and vacation trips. It lets you arrange your schedule so that you never forget an appointment or meeting — unless you forget your Model 100. It keeps track of expenses so that you'll never worry about losing records or adding up expenses on the back of a napkin.

There are two parts to the program: the scheduler routine and the expense routine. These arrange (sort-out) your entries as you make them so you don't need to sort and re-sort them to keep items in order. Furthermore, you can review any expense or appointment by date, account number, or special topic. For example, you can list all lunches charged at your favorite restaurant, all cash expenses, or all appointments

scheduled for April 13th. The Expense routine even keeps a running total of expenses to date.

PRINT AT HOME. To check either schedules or expenses (while you're on a plane flight, for instance), you can use both routines to look up a particular item that you've stored in the computer by displaying it on the screen. Or when you return home from a trip and want to make your records more permanent, you can attach a printer to your Model 100 and get a day-by-day listing of all your appointments and expenses. This is especially useful for reporting on a trip's progress or for itemizing expenses.

Travel Master is a Basic program, so you'll need to move the cursor to the

word Basic (on the Model 100's Main Menu) and press enter. The computer will display copyright information and the OK prompt, followed by a blinking cursor. At that point, type in the program exactly as it is listed on the following pages.

Once you have typed in the entire program, check it line-for-line for errors. To do so, first save it in the Model 100's memory by typing:

SAVE "TRAVEL" enter

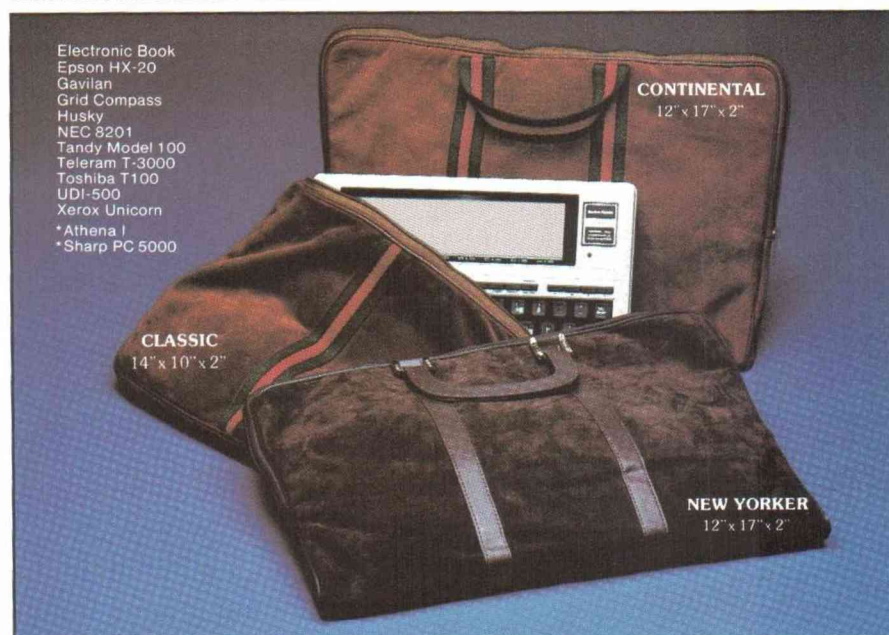
We also suggest that you save the program onto cassette tape at that time. Connect a cassette recorder to the Model 100 (see your owner's manual for details on volume control) and simultaneously press the recorder's record and play buttons. Be sure that you're in Basic and that the Travel Master program is loaded into memory, then type:

CSAVE "TRAVEL" enter

When the Basic OK prompt and blinking cursor return, press F8 to return to the Model 100 Main Menu. The program will be listed there as TRAVEL.BA.

RUN FOR ERRORS. The best way to check the program for errors is to run it. If there are any errors, the Model 100 will tell you the number of the line with the mistake. Simply retype the line (line number and all) the way it is listed in this article, and then execute the program again.





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If you can't type the entire program at one sitting, go ahead and save what you do type. Later, load those portions that you previously typed in, and then type in the rest of the program. Finally, save it again under the same name.

If you do not have a printer, you can omit typing Modules 3-A and 5-B, which provide printouts on expenses and schedules. (This sort of option is one reason the program was written in modular form.) If you do not type in these two modules, you must be careful to specify only S or s (for screen) when the program prompts you: "Print to Screen or Printer? (S/P)." Typing P (for printer) will cause the program to stop executing and the Basic OK prompt to return.

Once you've run the program, two data files, TRPSCH.DO and TRPEXP .DO, will be listed on the Model 100 Main Menu as well. Do *not* kill these files; they contain the information you've typed in.

Once you've typed in and saved the Travel Master program (in RAM and on cassette tape), return to the Model 100's Main Menu. You'll see TRAVEL.BA listed on the menu. Press the spacebar to position the cursor on the name TRAVEL.BA. Press enter to start the program.

OPTION SELECTION. The Travel Master Menu will then appear on your screen. Note that the word ENTER (directly below SCHEDULER) is displayed in reverse video because the cursor is on it. Under both the SCHEDULER and EXPENSE HANDLER, you can either enter or PRINT information.

To move the cursor from one option to the next, press F1 (labeled NEXT on the screen). As you press F1, the next option appears in reverse video, just as it does with the Model 100's Main Menu.

When you have moved to the option you want to select, press F2 (labeled SELECT on the screen).

When you've finished your Travel Master session and want to return to the Model 100 Main Menu, press F8 (labeled MENU on the screen). If you do not use this method of exiting from Travel Master, your function keys will be defined incorrectly and will not operate as expected with subsequent Basic programs.

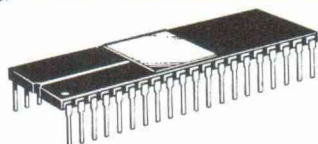
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TRAVEL MASTER

```

1 CALL 23164,0,23366
  : CALL 27795
  : KEY 6,"Edit"+CHR$(13)
5 'Travel Master -- Copyright 1983
  Sayre & Erickson
10 'Module 1 -- Main Driver
20 CLEAR 500
30 MAX FILES =2
  : DEFINT A-Z
40 RV$=CHR$(27)+"p"
  : NV$=CHR$(27)+"q"
50 KEY 1,"N"
  : KEY 2,"S"
  : KEY 3,""
  : KEY 4,""
  : KEY 5,""
  : KEY 6,""
  : KEY 7,""
  : KEY 8,"M"
60 CLS
  : PRINT NV$;
70 PRINT "Welcome to TRAVEL -- The
  Travel Master"
80 PRINT " Scheduler
  Expense Handler"
90 PRINT @280,"Next Select";
100 PRINT @315,"Menu";
110 OP$(0)="Enter"
  : PP(0)=84
120 OP$(1)="Print"
  : PP(1)=124
130 OP$(2)="Enter"
  : PP(2)=105
140 OP$(3)="Print"
  : PP(3)=145
150 R=0
160 FOR I=0 TO 3
  : PRINT @PP(I),NV$,P$(I);
  : NEXT I
170 PRINT @PP(R),RV$,OP$(R);NV$;
180 AS=INKEY$
  : IF AS="" THEN 180
190 IF AS="N" THEN R=(R+1) MOD 4
  : GOTO 160
200 IF AS="M" THEN CALL 23164,0,23366
  : CALL 27795
  : MENU
210 IF AS<>"S" THEN BEEP
  : GOTO 160
220 ON R+1GOSUB 240,650,1640,2050
230 GOTO 50
240 'Module 2 -- Schedule entry
250 ON ERROR GOTO 610
260 CLS
  : PRINT NV$;
270 PRINT @0,"Date of Event:
  / / ";
280 PRINT @40,"Time of Event: : ";
290 PRINT @80,"Location: "+STRING$(30,
  " ");
300 PRINT @120,"Notes: "+STRING$(33,
  " ");
310 PRINT @280,"Rcrd Cncl";
320 BF$=STRING$(73," ")
330 CC(0)=1
  : PP(0)=15
340 CC(1)=1
  : PP(1)=18
350 CC(2)=1
  : PP(2)=21
360 CC(3)=1
  : PP(3)=55
370 CC(4)=1
  : PP(4)=58
380 CC(5)=29
  : PP(5)=90
390 CC(6)=32
  : PP(6)=127
400 MW=6
  : MB=72
  : WD=0
  : BP=0
  : CH=0
410 GOSUB 3250
420 IF CS=CHR$(2)GOTO 580

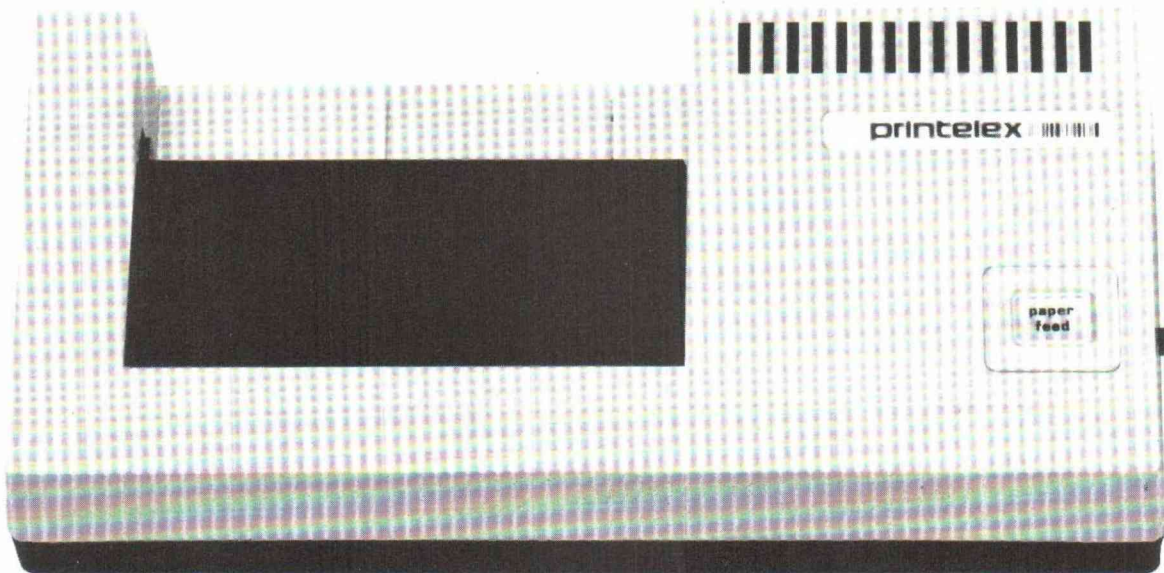
```

```

430 OPEN "TRPSCH" FOR INPUT AS 1
440 OPEN "TMPSCH" FOR OUTPUT AS 2
450 S1$=MID$(BF$,5,2)+MID$(BF$,1,
  4)+MID$(BF$,7,4)
460 IF EOF(1) THEN PRINT #2,BF$;
  : GOTO 540
470 IP$=INPUT $(73,1)
480 S2$=MID$(IP$,5,2)+MID$(IP$,1,
  4)+MID$(IP$,7,4)
490 IF S1$<S2$ THEN PRINT #2,BF$;
  : PRINT #2,IP$;
  : ELSE PRINT #2,IP$;
  : GOTO 460
500 IF EOF(1)GOTO 540
510 IP$=INPUT $(73,1)
520 PRINT #2,IP$;
530 GOTO 500
540 CLOSE 1,2
550 KILL "TRPSCH.DO"
560 NAME "TMPSCH.DO" AS "TRPSCH.DO"
570 GOTO 600
580 PRINT @292,NV$;"Operation
  cancelled!";
590 FOR I=1 TO 500
  : NEXT I
600 RETURN
610 IF ERR <>52 THEN PRINT @240,
  "Error #";ERR;" in line #";
  ERL
  : STOP
620 OPEN "TRPSCH.DO" FOR OUTPUT AS 1
630 CLOSE
640 RESUME
650 'Module 3 -- Print schedule
660 ON ERROR GOTO 610
670 CC(0)=1
  : PP(0)=20
680 CC(1)=1
  : PP(1)=23
690 CC(2)=1
  : PP(2)=26
700 CC(3)=1
  : PP(3)=58
710 CC(4)=1
  : PP(4)=61
720 CC(5)=1
  : PP(5)=64
730 CC(6)=20
  : PP(6)=99
740 CC(7)=0
  : PP(7)=154
750 CLS
  : PRINT NV$;
760 PRINT @0,"Starting with date:
  / / ";
770 PRINT @40,"Ending with date:
  / / ";
780 PRINT @80,"Specific topic(s):
  "+STRING$(21," ");
790 PRINT @120,"Print to Screen or
  Printer (S/P): ";
800 PRINT @280,"Print Cncl";
810 KEY 1,"N"
  : KEY 2,"C"
  : KEY 8,""
820 BF$=STRING$(34," ")
830 BP=0
  : CH=0
  : WD=0
  : MB=33
  : MW=7
840 GOSUB 3250
850 IF CS=CHR$(2) THEN PRINT @292,
  "Operation cancelled!";
  : GOTO 1110
860 SD$=MID$(BF$,5,2)+MID$(BF$,1,4)
870 ED$=MID$(BF$,11,2)+MID$(BF$,7,4)
880 IF ED$=" " THEN ED$="991231"
890 TC=0
900 TP$(1)=" "
  : TP$(2)=" "
910 PT=INSTR(13,BF$,CHR$(255))
920 IF PT=0 THEN 1070
930 TP$(1)=MID$(BF$,13,PT-13)

```


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TRAVEL MASTER

ter routines use the same method of accepting the information you type in. Each routine presents you with a "form" ready for you to fill out.

To enter expense and schedule information into the program, simply type in the data. The cursor advances every time you enter a character. When you have typed the last character of a particular word or number, the cursor will automatically advance to the start of the next word.

Don't worry about typing errors. If you make a mistake, use BKSP to erase the character. This key deletes the character immediately preceding the current cursor position.

If you want to delete a word, place the cursor over it and press ESC. This key deletes all the characters in the current word or item and places the cursor where the word's first character has been.

```

940 FOR I=1 TO LEN(TP$(1))
950 IF MID$(TP$(1),I,1)<"a" OR
    MID$(TP$(1),I,1)>"z" THEN 970
960 MID$(TP$(1),I,1)=CHR$(ASC(
    MID$(TP$(1),I,1))-32)
970 NEXT I
980 NP=PT+1
    : TC=1
990 PT=INSTR(NP,BF$,CHR$(255))
1000 IF PT=0 THEN 1070
1010 TP$(2)=MID$(BF$,NP,PT-NP)
1020 FOR I=1 TO LEN(TP$(2))
1030 IF MID$(TP$(2),I,1)<"a" OR
    MID$(TP$(2),I,1)>"z" THEN 1050
1040 MID$(TP$(2),I,1)=CHR$(ASC(
    MID$(TP$(2),I,1))-32)
1050 NEXT I
1060 TC=2
1070 OPEN "TPSCH" FOR INPUT AS 1
1080 IF MID$(BF$,34,1)="P" OR MID$(BF$,
    34,1)="p" THEN GOSUB 1130
    ELSE GOSUB 1310
1090 CLOSE
1100 PRINT @292,NV$;"End of file";
1110 FOR I=1 TO 1000
    : NEXT I
1120 RETURN
1130 'Module 3-A -- Print the schedule
    file on the printer
1140 OPEN "LPT:" FOR OUTPUT AS 2
1150 CR$=CHR$(13)
    : FF$=CHR$(12)
1160 PRINT #2,CR$;CR$;TAB(33);"Trip
    Schedule";CR$
1170 PRINT #2," Date Time
    Location";TAB(27);"Notes"
1180 LC=6
1190 OD$=""
1200 GOSUB 1480
1210 IF PF=0 THEN 1300
1220 ND$=MID$(BF$,1,2)+"/"+MID$(BF$,3,
    2)+"/"+MID$(BF$,5,2)
1230 IF ND$=OD$ THEN ND$=""
    ELSE OD$=ND$
    : LC=LC+1
    : PRINT #2,""
1240 PRINT #2,ND$;

1250 PRINT #2," "+MID$(BF$,7,
    2)+":"+MID$(BF$,9,2)+":";
1260 PRINT #2,MID$(BF$,11,30);" ";
1270 PRINT #2,MID$(BF$,41,33)
1280 LC=LC+1
1290 IF LC<60 THEN PRINT FF$
    : GOTO 1200
    ELSE 1160
1300 RETURN
1310 'Module 3-B -- Display the
    schedule file on the screen
1320 CLS
    : PRINT NV$;
1330 KEY 1,"N"
    : KEY 2,"Q"
1340 PRINT "Date of Event:"
1350 PRINT "Time of Event:"
1360 PRINT "Location:"
1370 PRINT "Notes:"
1380 PRINT @280,"Next Quit";

```

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MOVING THE CURSOR. You can use the left and right arrows to back up and advance the cursor, respectively. Unlike BKSP, these keys do not delete any characters. If you want to jump to the next word before you reach the end of the current word, press enter and the cursor will jump to the start of the next word.

When you are satisfied with the expenses or schedules you have entered, press F1 (to record the information into either the TRPEXP.DO or TRP-SCH.DO data file).

If at any time you decide you don't want to complete the form (for instance, if you selected PRINT when you wanted to enter), you may press F2 to return to the Travel Master Menu.

Once you've recorded an expense or appointment and you discover that the entry is incorrect, you can fix the problem. Return to the Model 100 Main Menu and position the cursor over TRPSCH.DO (for schedules) or TRP-EXP.DO (for expenses) and press enter. What you will see is the informa-

tion you typed in, but in a compressed format. Use the arrow keys to move the cursor to the mistake. Correct the mistake character by character. Adding too many characters or deleting too many can cause errors when you attempt to print or display the information. In other words, you can correct errors, but be careful.

APPOINTMENTS. To enter an appointment or event into a schedule file (automatically created and named TRPSCH.DO), press F1 to move the

```

1390 GOSUB 1480
1400 IF PF=0 THEN PRINT @292,"End of
      file";
      : GOTO 1470
1410 PRINT @15,LEFT$(BF$,2)+
      "/" +MID$(BF$,3,2)+"/"+MID$(BF$,5,
      2);
1420 PRINT @55,MID$(BF$,7,2)+
      "+" +MID$(BF$,9,2);
1430 PRINT @90,MID$(BF$,11,30);
1440 PRINT @127,MID$(BF$,41,33);
1450 AS=INKEY$
      : IF AS="N" THEN 1390
1460 IF AS<>"Q" THEN 1450
1470 RETURN
1480 'Module 3-C -- Validate input
1490 IF EOF(1) THEN PF=0
      : GOTO 1630
1500 BF$=INPUT $(73,1)
      : PF=1
1510 BD$=MID$(BF$,5,2)+MID$(BF$,1,4)
1520 IF BD$<SD$ OR BD$>ED$ THEN 1480
1530 IF TC=0GOTO 1630
1540 TB$=BF$
1550 FOR I=11 TO 83
1560 LC$=MID$(TB$,I,1)
1570 IF LC$<"a" OR TC$>"z" THEN 1590
1580 MID$(TB$,I,1)=CHR$(ASC(LC$)-32)
1590 NEXT I
1600 FOR I=1 TO TC
1610 IF INSTR(1,TB$,TP$(I))=0 THEN 1480
1620 NEXT I
1630 RETURN
1640 'Module 4 -- Enter a trip expense

1650 ON ERROR GOTO 2010
1660 CLS
      : PRINT NV$;
1670 PRINT "Account Number: _____";
1680 PRINT @25,"Date: ____/____/____";
1690 PRINT @40,"Amount: $_____";
1700 PRINT @62,"Paid With: _____";
1710 PRINT @80,"Notes: "+STRING$(33,
      " ");
1720 PRINT @280,"Rcrd Cncl";
1730 BF$=STRING$(56," ")
1740 PP(0)=16
      : CC(0)=3
1750 PP(1)=31
      : CC(1)=1
1760 PP(2)=34
      : CC(2)=1
1770 PP(3)=37
      : CC(3)=1
1780 PP(4)=49
      : CC(4)=4
1790 PP(5)=55
      : CC(5)=1
1800 PP(6)=73
      : CC(6)=5
1810 PP(7)=87
      : CC(7)=32
1820 CH=0
      : WD=0
      : BP=0
      : MW=7
      : MB=55
1830 GOSUB 3250
1840 IF CS=CHR$(2) THEN PRINT @295,NV$;
      "Operation cancelled!";
      : GOTO 1990
1850 OPEN "TRPEXP" FOR INPUT AS 1
1860 OPEN "TMPEXP" FOR OUTPUT AS 2
1870 S1$=MID$(BF$,9,2)+MID$(BF$,5,
      4)+MID$(BF$,1,4)
1880 IF EOF(1) THEN PRINT #2,BF$;
      : GOTO 1960
1890 IP$=INPUT $(56,1)
1900 S2$=MID$(IP$,9,2)+MID$(IP$,5,
      4)+MID$(IP$,1,4)
1910 IF S1$<S2$ THEN PRINT #2,BF$;
      : PRINT #2,IP$;
      ELSE PRINT #2,IP$;
      : GOTO 1880
1920 IF EOF(1)GOTO 1960
1930 IP$=INPUT $(56,1)
1940 PRINT #2,IP$;
1950 GOTO 1920
1960 CLOSE 1,2

1970 KILL "TRPEXP.DO"
1980 NAME "TMPEXP.DO" AS "TRPEXP.DO"
1990 FOR I=1 TO 1000
      : NEXT I
2000 RETURN
2010 IF ERR <>52 THEN PRINT @240,
      "Error #";ERR;" in line #";
      ERL
      : STOP
2020 OPEN "TRPEXP" FOR OUTPUT AS 1
2030 CLOSE 1
2040 RESUME
2050 'Module 5 -- Display or print
      trip expenses
2060 ON ERROR GOTO 2010
2070 CLS
      : PRINT NV$;
2080 PRINT @0,"Starting with Account
      Number: _____";
2090 PRINT @40,"Ending with Account
      Number: _____";
2100 PRINT @80,"Starting Date:
      ____/____/____";
2110 PRINT @120,"Ending Date:
      ____/____/____";
2120 PRINT @160,"Specific Topic(s):
      "+STRING$(21," ");
2130 PRINT @200,"Print to Screen or
      Printer (S/P): _____";
2140 PRINT @280,"Print Cncl";
2150 PP(0)=30
      : CC(0)=3
2160 PP(1)=68
      : CC(1)=3
2170 PP(2)=95
      : CC(2)=1

```


"There's No Time Wiser Than After Dark."

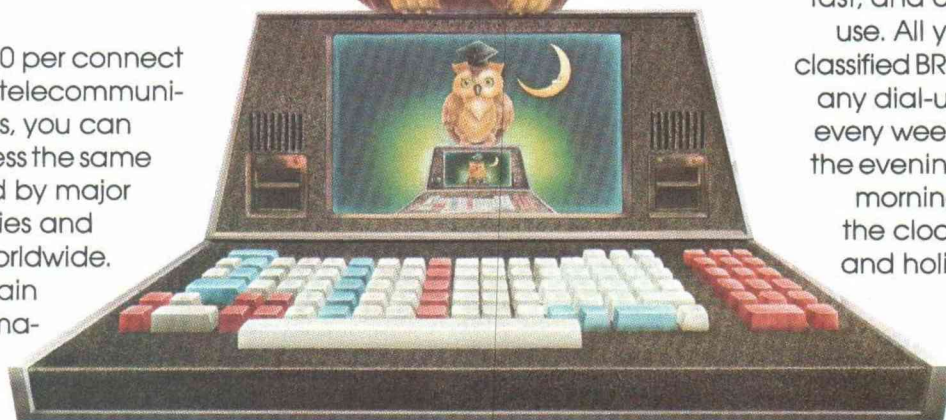
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cursor to the word enter (directly below the word SCHEDULER in the Travel Master Menu) and press F2. The routine will display the SCHEDULE EVENT ENTRY FORM.

Type in the date of the event in mm/dd/yy format. For example, 04/13/83 for April 13, 1983.

Next, type in the time in 24-hour format. For instance, type 13:30 for 1:30 p.m.

Then enter the location of the event. This can be a city or place of business — whatever makes sense to you.

Finally, type in any special notes about the event — a flight number, the names of persons meeting with or accompanying you, and the like.

When you have entered all the schedules you want, press F1. This stores your data (in a compressed format) in the file TRPSCH.DO

If you want to cancel the data before it is recorded, press F2 and you will return to the Travel Master Menu.

DISPLAY SCHEDULES. To display or

print out any or all of your schedules, position the Travel Master Menu cursor on the word PRINT (directly below the word SCHEDULE) and press F2. The program will display the SCHEDULE PRINT FORM.

To display or print out a schedule, you can specify starting and ending dates. The program will print all events that begin on or after the starting date and on or before the ending date.

If you leave the starting date blank, the program will start printing at the beginning of the file.

If you leave the ending date blank, the program will print to the end of the file.

TOPIC DISPLAY. The SPECIFIC TOPICS blank lets you indicate one or two schedule entry topics you want to see. For example, you may want to select all MEETINGS "WITH JIM," regardless of the date, but you may have no immediate interest in any APPOINTMENTS or LUNCHEONS.

To enter a specific topic (such as meetings), type in the topic and then press SHIFT-GRPH-C. This puts a half-solid graphics "block" at the end of the topic or word you typed in.

If you want to specify a second topic, type it in after the first graphics block and again press SHIFT-GRPH-C. For example, type MEETING JIM to see the list of all meetings with Jim. If you don't want to specify a second topic, simply press enter after the first graphics block.

If you don't want to specify any special topics, leave this space blank by simply pressing enter.

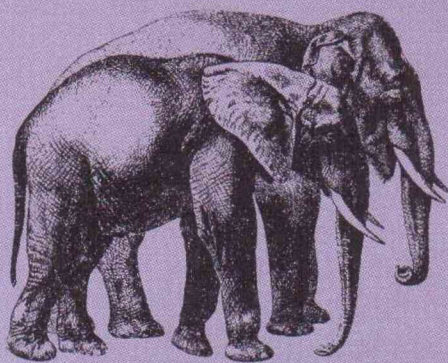
PRINTING APPOINTMENTS. The final input line on the form allows you to tell the program to display schedules on the Model 100 screen or to print them out on the printer.

To display schedules on the screen, either type nothing and press enter, or type S or s.

To print the information on the printer, type P or p.

If you have specified a print of the schedule, make sure your printer is correctly connected to the Model 100 and then press F1. The program will print the appointments you want on the printer. The information will be printed in the same order in which it was stored: from earliest to latest. When the end of the file is reached,

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the message END OF FILE will appear at the bottom of the screen and the Travel Master Menu will return.

If you want to display the schedules on the Model 100 screen, press F1. To see the next schedule, press F1 again. If you don't want to see any more schedules, press F2. When there are no more requested records in the file, an END OF FILE message will appear at the bottom of the screen and the Travel Master Menu will reappear.

EXPENSE FILE. To enter an expense into the expense file (which has been automatically created by the program and named TRPEXP.DO), press F1 to move the cursor to the word ENTER, directly below the words EXPENSE HANDLER in the Travel Master Menu, then press F2. The routine will display the Expense Event Entry Form.

The first blank on the screen is for a four-digit account number. This number is arbitrary. You can use a standard set of numbers designated by your company, or you can make up your own numbering system.

For example: 1000-level expenses may be meals, with 1100 for breakfasts, 1200 for lunches, and so on; 2000-level numbers may be transportation expenses, with 2100 for airlines, 2200 for car rentals, and so on.

After you have entered the account number, fill in the date of the expense in mm/dd/yy format: for instance, 04/13/83 for April 13, 1983.

Now complete the amount of the expense. There are six number spaces to fill. For amounts less than \$1000, keep the leading spaces blank by pressing the space bar or the arrow keys. For instance, to enter \$40, press the space bar twice, then type 4000 (the last two zeros will be to the right of the decimal point).

To fill in the blank labeled PAID WITH, type the form of payment, such as Amex, VISA, or the like for credit card charges, or cash, or C#1000 for a check purchase with check number 1000.

Finally, fill in the NOTES blank with information relevant to the expense (such as AA Flight to Boston or Victoria Station for lunch with Marie).

STORING EXPENSES. When you have entered all the information you want, press F1. This stores your data (in a compressed format) in a file called TRPEXP.DO.

The program stores the expense first according to date, and then according to account number. Consequently, an expense on August 19, 1983 under account number 2100, comes before an expense on the same day under account number 3100, but after all expenses on August 18.

If you want to cancel the data before it is recorded in the file, press F2 and you will return to the Travel Master Menu.

DISPLAYING EXPENSES. To display

or print any or all of your expenses on the Travel Master Menu, position the cursor to the word PRINT, directly below EXPENSE HANDLER and press F2. The program will display the Expense Print Form.

The first two blanks are for starting and ending account numbers. You can specify the lowest and highest account numbers for which you want to see expenses.

If you leave the starting account number blank, the program will com-

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mence with the lowest account number in the file.

If you leave the ending account number blank, the program will print up to the highest account number.

Likewise, you may specify a starting and ending date for printing out expenses. The program will print all expenses that occurred on or after the starting date and before the ending date.

If you leave the starting date blank, the program will start printing at the beginning of the file.

If you leave the ending date blank,

the program will print to the end of the file.

The SPECIFIC TOPICS blank lets you indicate one or two particular topics for which you want to see the expense entry. Say, for example, you want to see all of your expenses paid for with your VISA card. Type in the topic, here VISA, then press SHIFT-GRPH-C. This puts a half-solid graphics block at the end of the topic. If you want to specify a second topic, type it in after the first graphics block, and again press SHIFT-GRPH-C: for instance, VISA, AMEX.

```

2180 PP(3)=98
      : CC(3)=1
2190 PP(4)=101
      : CC(4)=1
2200 PP(5)=133
      : CC(5)=1
2210 PP(6)=136
      : CC(6)=1
2220 PP(7)=139
      : CC(7)=1
2230 PP(8)=179
      : CC(8)=20
2240 PP(9)=230
      : CC(10)=0
2250 CH=0
      : WD=0
      : BP=0
      : MW=9
      : MB=41
2260 BFS=STRING$(42," ")
2270 GOSUB 3250
2280 IF CS=CHR$(2) THEN PRINT @300,
      "Operation cancelled!";
      : GOTO 2580
2290 SDS=MID$(BFS,13,2)+MID$(BFS,9,4)
2300 EDS=MID$(BFS,19,2)+MID$(BFS,15,4)
2310 IF EDS=" " THEN EDS="991231"
2320 SAS=MID$(BFS,1,4)
2330 EAS=MID$(BFS,5,4)
2340 IF EAS=" " THEN EAS="ZZZZ"
2350 TC=0
2360 TP$(1)=" "
      : TP$(2)=" "
2370 PT=INSTR(13,BFS,CHR$(255))
2380 IF PT=0 THEN 2530
2390 TP$(1)=MID$(BFS,21,PT-21)
2400 FOR I=1 TO LEN(TP$(1))
2410 IF MID$(TP$(1),I,1)<"a" OR
      MID$(TP$(1),I,1)>"z" THEN 2430
2420 MID$(TP$(1),I,1)=CHR$(ASC(
      MID$(TP$(1),I,1))-32)
2430 NEXT I
2440 NP=PT+1
      : TC=1
2450 PT=INSTR(NP,BFS,CHR$(255))
2460 IF PT=0 THEN 2530
2470 TP$(2)=MID$(BFS,NP,PT-NP)
2480 FOR I=1 TO LEN(TP$(2))
2490 IF MID$(TP$(2),I,1)<"a" OR
      MID$(TP$(2),I,1)>"z" THEN 2510
2500 MID$(TP$(2),I,1)=CHR$(ASC(
      MID$(TP$(2),I,1))-32)
2510 NEXT I
2520 TC=2
2530 OPEN "TRPEXP" FOR INPUT AS 1
2540 IF MID$(BFS,42,1)="P" OR MID$(BFS,
      42,1)="p" THEN GOSUB 2850
      ELSE GOSUB 2590
2550 PRINT @300,NVS;"End of file";
2560 FOR I=1 TO 1000
      : NEXT I
2570 CLOSE

```


If you don't want to specify a second topic, simply press enter.

SELECTING OUTPUT. The final blank on the form tells the program where to display the expense information.

To display the information on the Model 100 screen, type nothing and press enter or type S or s.

To print the information on a printer, type P or p.

If you're printing out the information on a printer, make sure your printer is correctly connected to your Model 100, and then press F1. The

program will search TRPEXP.DO for expenses that match what you have specified and print those records on the printer. When it has reached the end of the file, it will briefly display the message END OF FILE at the bottom of the screen and return to the Travel Master Menu.

If you want the information displayed on the Model 100 screen, press F1. When the program finds a matching record, it will display the data in the format in which you entered it. If you don't want to see any more records, press F2. To see the next ex-

```

2580 RETURN
2590 'Module 5-A -- Display expenses
      on the screen
2600 KEY 1,"N"
      : KEY 2,"Q"
      : KEY 8,""
2610 CLS
      : PRINT NV$;
2620 PRINT @0,"Account Number:";
2630 PRINT @25,"Date:";

2640 PRINT @40,"Amount:$";
2650 PRINT @62,"Paid With:";
2660 PRINT @80,"Notes:";
2670 PRINT @200,"Running Total:$"
2680 PRINT @280,"Next Quit";
2690 TT!=0
2700 GOSUB 3080
2710 IF PF=0GOTO 2830
2720 PRINT @16,MID$(BF$,1,4);
2730 PRINT @31,MID$(BF$,5,2)+
      "/" + MID$(BF$,7,2) + "/" + MID$(BF$,9,
      2);
2740 AM!=VAL(MID$(BF$,11,7))/100
2750 TT!=TT!+AM!
2760 PRINT @49,USING "#####.##";AM!;
2770 PRINT @73,MID$(BF$,18,6);
2780 PRINT @87,MID$(BF$,24,33);
2790 PRINT @215,USING "#####.##";TT!
2800 A$=INKEY$
2810 IF A$="N" THEN 2700
2820 IF A$<>"Q" THEN 2800
2830 CLOSE 1
2840 RETURN
2850 'Module 5-B -- Display expenses
      on the printer
2860 OPEN "LPT:" FOR OUTPUT AS 2
2870 TT!=0
      : OD$=""
2880 PRINT #2,CR$;CR$;TAB(33);"Expense
      Report";CR$
2890 PRINT #2,TAB(11);"Account Paid"
2900 PRINT #2," Date Number With
      Notes";TAB(32);"Amount
      Total"
2910 LC=7
2920 GOSUB 3080
2930 IF PF=0GOTO 3070
2940 ND$=MID$(BF$,5,2) + "/" + MID$(BF$,7,
      2) + "/" + MID$(BF$,9,2)
2950 IF ND$=OD$ THEN ND$=""
      ELSE OD$=ND$
      : LC=LC+1
      : PRINT #2,""
2960 PRINT #2,ND$+" ";
2970 PRINT #2,MID$(BF$,1,4) + " ";
2980 PRINT #2,MID$(BF$,18,6) + " ";
2990 PRINT #2,MID$(BF$,24,33);
3000 AM!=VAL(MID$(BF$,11,7))/100
3010 TT!=TT!+AM!
3020 PRINT #2,USING "#####.##";AM!;
3030 PRINT #2," ";

```

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pense within the range you specify, press F1. When the program has printed out all matching records, it will briefly display the message END OF FILE at the bottom of the screen and return to the Travel Master Menu.

CASSETTE STORAGE. You might want to store the data files TRPEXP.DO and TRPSCH.DO on cassette tape and catalog them according to individual trips, months, or years. For instance, you might label one cassette tape Expenses for January 1984, and another tape San Francisco Expenses 4/84, and so on. It would be wise to keep a printout of the expenses and

schedules as well.

Don't be afraid to customize the program to suit your specific needs. (Before making any changes however, we recommend that you make a master tape of the program.

Again, if you don't have a printer and want to save memory space and typing, leave out those program modules that provide printed copies of expenses and schedules — namely, Modules 3-A and 5-B. If you do not type in these two modules, you must specify only S (for screen) when the program asks you PRINT TO SCREEN OR PRINTER? (S/P). If you type P for printer, the program will stop execu-

tion and return to the Basic OK prompt.

The Model 100 can also be used with printers other than Radio Shack printers. You'll need to check your printer's operation manual for communications protocol (baud rate and the like) and to set the Model 100's to match. To use a serial printer with the Model 100 (Radio Shack does not recommend this), connect the printer to the RS-232C connector on the back of the computer and change lines 1140 and 2860 to OPEN "COM:68E1E" FOR OUTPUT AS 2. You can set the baud to a higher rate if necessary. See the OPEN statement in your Model 100 owner's manual for more details. ▽

```

3040 PRINT #2,USING "#####.##";TT!
3050 LC=LC+1
3060 IF LC<60GOTO 2920

      ELSE GOTO 2880
3070 RETURN
3080 'Module 5-C -- Validate input
3090 IF EOF(1) THEN PF=0
      : GOTO 3240
3100 BF$=INPUT $(56,1)
      : PF=1
3110 IF MID$(BF$,1,4)<SA$ OR MID$(BF$,
      1,4)>EA$GOTO 3080
3120 ID$=MID$(BF$,9,2)+MID$(BF$,5,4)
3130 IF ID$<SD$ OR ID$>ED$GOTO 3080
3140 IF TC=0GOTO 3240
3150 TB$=BF$
3160 FOR I=11 TO 55
3170 LC$=MID$(TB$,I,1)
3180 IF LC$<"a" OR TC$>"z" THEN 3200
3190 MID$(TB$,I,1)=CHR$(ASC(LC$)-32)
3200 NEXT I
3210 FOR I=1 TO TC
3220 IF INSTR(1,TB$,TP$(I))=0 THEN
      GOTO 3080
3230 NEXT I
3240 RETURN
3250 'Module 6 -- Keyboard input
      routine
3260 KEY 1,CHR$(1)
      : KEY 2,CHR$(2)
      : KEY 8,""
3270 AS $=MID$(BF$,BP+1,1)
3280 IF AS $=" " THEN AS $=" "
3290 PRINT @PP(WD)+CH,NV$; AS $;
3300 C$=INKEY$
      : IF C$="" THEN 3300
3310 IF C$=CHR$(28) THEN GOSUB 3470
3320 IF C$=CHR$(29) THEN GOSUB 3390
3330 IF C$>CHR$(31) THEN GOSUB 3670
3340 IF C$=CHR$(8) THEN GOSUB 3780
3350 IF C$=CHR$(27) THEN GOSUB 3550
3360 IF C$=CHR$(13) THEN GOSUB 3610
3370 IF C$=CHR$(1) OR C$=CHR$(2) THEN
      RETURN
3380 GOTO 3270
3390 'Module 6-A -- Left arrow
      processing
3400 PRINT @PP(WD)+CH,NV$; AS $;
3410 CH=CH-1
      : BP=BP-1
3420 IF CH=0 THEN GOTO 3460
3430 WD=WD-1
3440 IF WD<0 THEN WD=MW
      : BP=MB
3450 CH=CC(WD)

3460 RETURN
3470 'Module 6-B -- Right arrow
      processing
3480 PRINT @PP(WD)+CH,NV$; AS $;
3490 CH=CH+1
      : BP=BP+1
3500 IF CH=CC(WD)GOTO 3540
3510 WD=WD+1
3520 IF WD>MW THEN WD=0
      : BP=0
3530 CH=0
3540 RETURN
3550 'Module 6-C -- Escape key
      processing
3560 BP=BP-CH
3570 CH=0
3580 MID$(BF$,BP+1,CC(WD)+1)=
      STRING$(CC(WD)+1," ")
3590 PRINT @PP(WD)+CH,NV$;STR
      ING$(CC(WD)+1," ")
3600 RETURN
3610 'Module 6-D -- Enter key
      processing
3620 PRINT @PP(WD)+CH,NV$; AS $;
3630 BP=BP+(CC(WD)-CH)+1
      : WD=WD+1
3640 IF WD>MW THEN WD=0
      : BP=0
3650 CH=0
3660 RETURN
3670 'Module 6-E -- Printable letter
      processing
3680 MID$(BF$,BP+1,1)=C$
3690 BP=BP+1
3700 IF C$=" " THEN C$=" "
3710 PRINT @PP(WD)+CH,NV$;C$;
3720 CH=CH+1
3730 IF CH=CC(WD)GOTO 3770
3740 WD=WD+1
3750 IF WD>MW THEN WD=0
      : BP=0
3760 CH=0
3770 RETURN
3780 'Module 6-F -- Backspace
      processing
3790 PRINT @PP(WD)+CH,NV$; AS $;
3800 BP=BP-1
3810 CH=CH-1
3820 IF CH=0GOTO 3860
3830 WD=WD-1
3840 IF WD<0 THEN WD=MW
      : BP=MB
3850 CH=CC(WD)
3860 MID$(BF$,BP+1,1)=" "
3870 RETURN ▽

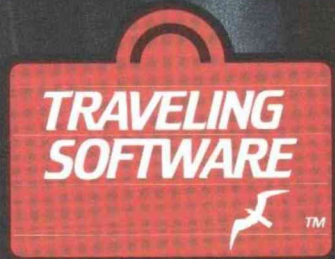
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One of mankind's earliest learned skills is sorting. With this machine-language sort, it can be your 100's, too.

By RONALD F. BALONIS

We all need to make order from chaos. Sorting is one of our earliest learned activities. The same is true of a computer. It needs a sort to keep its files in order. But sorting on one, like the Model 100 with limited memory, is not easy or efficient in Basic. Thinking of all my still unwritten Model 100 programs, my first need became a sort utility for my Model 100.

Well, I like to solve my own problems, and the challenge of assembly programming with the uncertainty of almost no documentation was even more incentive. My solution, that I will describe, resulted in two programs: one to boot a machine sort program into memory and one to call and house-keep it.

ASSORTED PROGRAMMING. I call the programs QSBOOT.BA (Quick Sort Boot) and QCKSRT.BA (Quick Sort). QSBOOT.BA loads the 308-byte, machine-language sort program into memory, then saves it as QSORT.CO. To sort a file, run QCKSRT.BA; it loads the machine-language program, prompts for the name of the file to sort and the sort position, sorts it, and displays any error.



With a lot of trial and error, I modeled the machine-language program on my TRS-80 Model I; then, translated it by hand to decimal notation and keyed it into the Model 100 boot program for more trial and error. The task was not as difficult as it sounds; I used a Texas Instruments LCD Programmer Calculator to convert the code to decimal. Surprisingly, the Model 100's ROM is quite friendly when you get to know it, but your errors are not forgiven, even then. Most result in a cold restart!

What does it take to sort a file in the 100's memory? Well, for my sort routine you need a file with records of equal length, the length and number of records, and the file's location in memory. The Model 100 ROM's directory routine (CALL 23211) finds the file and gives the location, but the rest

must be done by the program. The sort routine is a machine-code version of my favorite, the popular Shell-Metzner algorithm.

THE DESCRIPTION. Don't consider this a tutorial on either sorting algorithms or machine-language programming; both have been covered many times in computing publications over the years.

To me, programs, literally, become black-box computing tools...I soon forget the internal workings. But, for anyone interested in how this machine-language program does what it does, refer to listing 1. The comments in the listing are intended to make it self-explanatory. I hope I've succeeded.

Sequentially, the program modules of the listing are:

- Parameter block,
- Directory search and file tests,
- Count of records and length test,
- Sort field length computation and sort position test, and
- Shell-Metzner sort.

This machine program is invoked by a CALL to 62659 with the sort position in register A and the file name's VARPTR in the HL register. A sort of the file can only occur if (1) the file is found, (2) the file is text, (3) the file records are equal, and (4) the sort position is valid, otherwise an error flag is set at memory location 62650. The flags are: 0 for file sorted okay, 1 for file not found, 2 for file not text, 3 for records unequal and, 4 for sort posi-

tion error. Once again, the ROM is unforgiving if you error!

The boot program QSBOT.BA, listing 2, makes the machine-language program into the QSORT.CO file on the 100. It reads the data statements and pokes them into memory from 62650 to 62957; then saves the program as the machine file. The Basic program QCKSRT.BA, listing 3, sets memory and loads QSORT.CO. Then, prompts for a file name and the sort position and passes them to the sort by CALL 62659,< Sort Position>,<VARPTR(filename)>. On return from the sort routine it reads memory

location 62650 to test for error; if any, displays the message and then goes to the menu.

HOW TO. Here's how to get it running on your 100. First key in both Basic programs. Run QSBOT.BA; save it to tape and kill it; you don't need it anymore.

Now to use the sort. The file can only have a record length and number not greater than 255. The single byte integer computations used in the sort routine set a maximum of 255 for the number of records and the length of records. The sort position is 1 to <rec-

ord length>; this position defines the sort field from the *right end* of each record. In other words, the sort field is always to the right of the sort position. Why? Because it makes the passing of variables to the sort simple, does away with the overhead of error testing code, and coincides with my sorting needs. RUN QCKSRT.BA, enter file name and sort position and in a second or two, it will announce sort done or the file error.

To use the utility in a Basic program, use QCKSRT.BA as a model. Be mindful of the constraints, and always backup your files. ♣

1 CLEAR 100,MAX RAM-310	: CALL 62669,POS%,VARPTR(FNME\$)
: LOAD M"QSORT.CO"	: IRROR=PEEK(62650)+1
: CLS	: ON IRRORGOSUB 4,5,6,7,8
: PRINT @10,"** QUICK FILE SORT	
**"	
	3 PRINT @289,MSSG\$;
: PRINT @289," *** ENTER TO EXIT	: FOR I=1 TO 250
*** ";	: NEXT I
	: MENU
: PRINT @80,"FILE TO SORT? ";	4 MSSG\$=" *** SORT DONE! *** "
: INPUT FNME\$: RETURN
	5 MSSG\$="*** FILE NOT FOUND *** "
: IF FNME\$="" THEN MENU	: RETURN
:	6 MSSG\$="*** FILE NOT TEXT! *** "
ELSE PRINT @160,"SORT POSITION?	: RETURN
";	7 MSSG\$="*** UNEQUAL RECORDS ***"
: INPUT POS%	: RETURN
: IF POS%<1 THEN POS%=1	8 MSSG\$="*** SORT POSITION? *** "
	: RETURN
2 FNME\$=FNME\$+CHR\$(0)	
: POS%=POS%-1	

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```

0 ' QSBOOT.BA * QUICK FILE SORT
  BOOT *
5 ' RUN TO PUT THE MACHINE LANGUAGE
10 ' PROGRAM <QSORT.CO> IN 100'S
  MEMORY
15 'BY RON BALONIS 10/16/83

30 '
40 '--- CLEAR SPACE FOR PROGRAM
50 CLEAR 100,MAX RAM-310
60 CLS
   : PRINT @10,"** QUICK SORT BOOT
   **"

90 '
100 '---READ DATA STATEMENTS
105 '---AND PLACE IN MEMORY
110 FOR I=62650 TO 62958
120 READ DAT
   : PRTY=PRTY+DAT
   : POKE I,DAT
130 NEXT I

135 '---TEST FOR PARITY OF DATA
140 '---CHECK FOR ERROR IN DATA
150 IF PRTY=43704 THEN 200
160 PRINT @130,"*** ERROR IN DATA ***"
170 FOR I=1 TO 1000
180 NEXT I
   : MENU

190 '
195 '---SAVE IT AS <QSORT.CO>
200 SAVE M"QSORT.CO",62650,62958,62958
300 '
400 '
500 '

10000 '---MACHINE LANGUAGE SORT
10005 DATA 0, 0, 0, 0, 0, 0, 0, 0
10010 DATA 0, 0, 0, 0, 0, 0, 0, 0
10015 DATA 0, 0, 0, 0, 0, 0, 50,193
10020 DATA 244,205,215,244, 50,186,244
10025 DATA 201,126,205,227, 90,235,205

```

```

10030 DATA 171, 90,202,238,244,126,254
10035 DATA 192,194,241,244,205,227, 90
10040 DATA 195,244,244, 62, 1,201, 62
10045 DATA 2,201, 34,188,244, 43, 6
10050 DATA 0, 35, 4, 62, 26,190,202
10055 DATA 41,245, 62, 13,190,194,250
10060 DATA 244, 35, 4, 62, 10,190,194
10065 DATA 250,244, 58,190,244, 60, 50
10070 DATA 190,244, 58,191,244,183,194
10075 DATA 34,245,120, 50,191,244,184
10080 DATA 202,248,244, 62, 3,201, 58
10085 DATA 191,244, 33,193,244,150, 50
10090 DATA 192,244,210, 57,245, 62, 4
10095 DATA 201, 58,190,244, 50,204,244
10100 DATA 50,203,244, 58,203,244,183

10105 DATA 31,183, 50,203,244,202,236
10110 DATA 245, 58,204,244, 33,203,244
10115 DATA 150, 50,201,244, 62, 1, 50
10120 DATA 200,244, 58,200,244, 50,199
10125 DATA 244, 58,199,244, 71, 58,203
10130 DATA 244,128, 50,202,244,205,208
10135 DATA 245, 34,197,244,235, 42,193
10140 DATA 244, 25,229, 58,199,244,205

10145 DATA 208,245, 34,195,244,235, 42
10150 DATA 193,244, 25,235,225, 58,192
10155 DATA 244, 71, 26,150,194,156,245
10160 DATA 19, 35, 5,194,142,245,202
10165 DATA 194,245,250,194,245, 58,191
10170 DATA 244, 71, 42,195,244,235, 42
10175 DATA 197,244, 26, 79,126, 18,113
10180 DATA 19, 35, 5,194,170,245, 58

10185 DATA 199,244, 33,203,244,150, 50
10190 DATA 199,244,242, 99,245, 33,200
10195 DATA 244, 52, 58,201,244,190,218
10200 DATA 66,245,195, 93,245, 22, 0
10205 DATA 95, 29, 58,191,244, 33, 0

10210 DATA 0, 6, 8, 41, 7,210,226
10215 DATA 245, 25, 5,194,220,245,235
10220 DATA 42,188,244, 25,201, 62, 0
10225 DATA 201

```

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SORT

QSORT.CO QUICK MACHINE SORT FOR THE '100
BY RON BALONIS BASED ON THE
SHELL-METZNER ALGORITHM

===== MODEL 100 ROM ROUTINES =====

23211 DIR :DIRECTORY ROUTINE
23267 GETHL :PUT (HL) IN HL

===== SORT FILE PARAMETER TABLE =====

62650 ERROR	0
62651 TYPE	0
62652 START	0, 0
62654 NOREC	0
62655 RECLN	0
62656 FLDLN	0
62657 SPOS	0, 0

===== SHELL-METZNER SORT VARIABLES =====

62659 IADDR	0, 0
62661 LADDR	0, 0
62663 II	0
62664 JJ	0
62665 KK	0
62666 LL	0
62667 MM	0
62668 NN	0

===== CALL 62669,<SORT POSITON>,<FILE NAME VARPTR> =====

===== SORT STARTS AT 62669 ===== :-----
62669 BEGIN LD (SPOS),A 50,193,244 :GET SORT POSITION
62672 CALL DIRCK 205,215,244 :TRY TO SORT FILE
62675 LD (ERROR),A 50,186,244 :LOAD ERROR #
62678 RET 201 :AND RETURN

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SORT

===== LOCATE FILE IN DIRECTORY ===== :-----

```
62679 DIRCK LD A,(HL) 126 :GET LOCATION
62680 CALL GETHL 205,227,90 :OF FILE NAME
62683 EX DE,HL 235 :
62684 CALL DIR 205,171,90 :IN DIRECTORY?
62687 JP Z,ERR1 202,238,244 :NO - A #1 ERROR
62690 LD A,(HL) 126 :LOAD FILE TYPE
62691 CP 192 254,192 :IS IT TEXT?
```

```
62693 JP NZ,ERR2 194,241,244 :NO - A #2 ERROR
62696 CALL GETHL 205,227,90 :GET FILE ADDRESS
62699 JP OK 195,244,244 :FILE'S OK
62702 ERR1 LD A,1 62, 1 :FILE NOT FOUND
62704 RET 201 :ERROR RETURN
62705 ERR2 LD A,2 62, 2 :FILE'S NOT TEXT
62707 RET 201 :ERROR RETURN
```

===== FIND NUMBER & LENGTH OF RECORDS IN FILE =====

```
===== TEST FOR EQUAL RECORD LENGTHS ===== :-----
62708 OK LD (START),HL 34,188,244 :SAVE FILE START
62711 DEC HL 43 :
62712 MOREC LD B,0 6, 0 :FIND NUMBER OF
62714 MOREL INC HL 35 : RECORDS
```

```
62715 INC B 4 :
62716 LD A,26 62, 26 :
62718 CP (HL) 190 :END OF FILE?
62719 JP Z,EQF 202, 41,245 :NO --- GO MOREL
```

```
62722 LD A,13 62, 13 :
62724 CP (HL) 190 :END OF RECORD?
62725 JP NZ,MOREL 194,250,244 :NO --- GO MOREL
62728 INC HL 35 :
62729 INC B 4 :
```

```
62730 LD A,10 62, 10 :
62732 CP (HL) 190 :END OF RECORD?
62733 JP NZ,MOREL 194,250,244 :NO --- GO MOREL
62736 LD A,(NOREC) 58,190,244 :
62739 INC A 60 : A RECORD!
62740 LD (NOREC),A 50,190,244 :
```

```
62743 LD A,(RECLN) 58,191,244 :CHECK LENGTH
62746 OR A 183 :OF RECORD
62747 JP NZ,NOT0 194, 34,245 :FIRST RECORD?
62750 LD A,B 120 :YES!
62751 LD (RECLN),A 50,191,244 :SAVE LENGTH
62754 NOT0 CP B 184 :LENGTH = FIRST?
62755 JP Z,MOREC 202,248,244 :YES --- GO MOREC
62758 LD A,3 62, 3 :NO! NOT EQUAL!
62760 RET 201 :ERROR RETURN
```

```
===== COMPUTE SORT FIELD LENGTH ===== :-----
62761 BOP LD A,(RECLN) 58,191,244 :SORT FIELD LENGTH
62764 LD HL,SPOS 33,193,244 :RECORD LENGTH MINUS
62767 SUB (HL) 150 :SORT POSITION
```

```
62768 LD (FLDLN),A 50,192,244 :
62771 JP NC,QSORT 210, 57,244 :OK! --- SORT IT
62774 LD A,4 62, 4 :SORT POS > REC LGTH
62776 RET 201 :ERROR RETURN
```

```
=== DO A SHELL-METZNER SORT OF FILE === :-----
62777 QSORT LD A,(NOREC) 58,190,244 :
62780 LD (NN),A 50,204,244 :N=# OF RECORDS
```

```
62783 SORT0 LD (MM),A 50,203,244 :M=N
62786 SORT1 LD A,(MM) 58,203,244 :-----
62789 OR A 183 :
62790 RRA 31 :M=INT(M/2)
62791 OR A 183 :
```

```
62792 LD (MM),A 50,203,244 :-----
62795 JP Z,DONE 202,236,245 :M=0?
62798 LD A,(NN) 58,204,244 :-----
62801 LD HL,MM 33,203,244 :
62804 SUB (HL) 150 :K=N-M
62805 LD (KK),A 50,201,244 :-----
62808 LD A,1 62, 1 :
```

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62810 LD (JJ),A 50,200,244 :J=1
62813 SORT2 LD A,(JJ) 58,200,244 :-----
62816 LD (II),A 50,199,244 :I=J
62819 SORT3 LD A,(II) 58,199,244 :-----
62822 LD B,A 71 :
62823 LD A,(MM) 58,203,244 :L=I+M
62826 ADD A,B 128 :
62827 LD (LL),A 50,202,244 :-----
62830 CALL ADDR 205,208,245 :COMPUTE ADDRESS OF
62833 LD (LADDR),HL 34,197,244 :RECORD L

62836 EX DE,HL 235 :
62837 LD HL,(OFFST) 42,193,244 :
62840 ADD HL,DE 25 :
62841 PUSH HL 229 :
62842 LD A,(II) 58,199,244 :
62845 CALL ADDR 205,208,245 :COMPUTE ADDRESS OF
62848 LD (IADDR),HL 34,195,244 :RECORD I
62851 EX DE,HL 235 :
62852 LD HL,(OFFST) 42,193,244 :

62855 ADD HL,DE 25 :-----
62856 EX DE,HL 235 :
62857 POP HL 225 :
62858 LD A,(FLDLN) 58,192,244 :
62861 LD B,A 71 : LESS THAN
62862 CMPAR LD A,(DE) 26 : OR EQUAL TO

62863 SUB (HL) 150 :
62864 JP NZ,TESTA 194,156,245 : RECORD (L)?
62867 INC DE 19 :
62868 INC HL 35 :
62869 DEC B 5 :
62870 JP NZ,CMPAR 194,142,245 :-----
62873 JP Z,SORT4 202,194,245 :=? YES! GO SORT4
62876 TESTA JP M,SORT4 250,194,245 :<? YES! GO SORT4

===== NO! THEN SWAP THE RECORDS =====
62879 LD A,(RECLN) 58,191,244 :RECORD LENGTH IN B
62882 LD B,A 71 :RECORD(I) IN DE
62883 LD HL,(IADDR) 42,195,244 :RECORD(L) IN HL
62886 EX DE,HL 235 :
62887 LD HL,(LADDR) 42,197,244 :
62890 SWAP LD A,(DE) 26 :
62891 LD C,A 79 :

```

```

62892 LD A,(HL) 126 :
62893 LD (DE),A 18 : SWAP A AND C
62894 LD (HL),C 113 :
62895 INC DE 19 :
62896 INC HL 35 :
62897 DEC B 5 :
62898 JP NZ,SWAP 194,170,245 :SWAP TILL B=0

=====
62901 LD A,(II) 58,199,244 :
62904 LD HL,MM 33,155,244 :I=I-M
62907 SUB (HL) 150 :
62908 LD (II),A 50,199,244 :-----
62911 JP P,SORT3 242, 99,245 :I>0? --- GO SORT3

=====
62914 SORT4 LD HL,JJ 33,200,244 :
62917 INC (HL) 52 :J=J+1
62918 LD A,(KK) 58,201,244 :
62921 CP (HL) 190 :J>K?
62922 JP C,SORT1 218, 66,245 :J>K? --- GO SORT1
62925 JP SORT2 195, 93,245 :J<=K --- GO SORT2

===== GET A RECORD'S ADDRESS =====
62928 ADDR LD D,0 22, 0 :
62930 LD E,A 95 :
62931 DEC E 29 :RECORD LENGTH TIMES
62932 LD A,(RECLN) 58,191,245 :RECORD NUMBER
62935 LD HL,0 33, 0, 0 :PLUS FILE ADDRESS
62938 LD B,8 6, 8 :EQUALS
62940 MULT ADD HL,HL 41 :RECORD ADDRESS

62941 RLCA 7 :
62942 JP NC,NCARY 210,226,245 :
62945 ADD HL,DE 25 :
62946 NCARY DEC B 5 :
62947 JP NZ,MULT 194,220,245 :
62950 EX DE,HL 235 :
62951 LD HL,(START) 42,188,244 :
62954 ADD HL,DE 25 :
62955 RET 201 :

===== RETURN/FILE SORTED & NO ERROR=====
62956 DONE LD A,0 62, 0 :NO ERROR
62958 RET 201 :SORTED RETURN

```

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TEST YOUR MEMORY AND HAVE FUN WITH THIS MEMORY STRETCHER

Editor's Note: Dave's column is based on his 25 Games for Your Model 100 published by Tab Books of Blue Ridge Summit, PA 17214.

How good is your memory? Find out with "Memory Stretch."

"Memory Stretch" shows you a sentence assembled from a random collection of adjectives, adverbs, nouns, and verbs by the computer. The sentence will make grammatical sense, but may not mean much else. You will be shown the sentence only for a few seconds — or a fraction of a second as you improve. You will be required to type out the sentence — exactly — after it has vanished from the screen.

If you do so, the computer will show you another sentence, for a briefer time. This continues until either you or the computer reaches the limit.

The sentences are made up of five words or phrases, stored in data lines, and loaded into an array, S\$(row, column). Twenty of each word type are available, producing thousands of different sentence combinations. The computer will select one segment from each column, and then print it to the screen.

DELAY LOOP. The length of time the sentence appears on the screen is determined by a delay loop in line 630. The loop at first repeats 500 times. If the player types in the sentence correctly, the delay is increased by 25 percent.

To make the sentence easier to read, it is not split in the middle of words.

The individual letters of the sentence are printed to the screen, one character at a time, in a For-Next loop from 1 to LEN(S\$). As soon as the sentence is 25 characters long, FLAG is set to one, and henceforth, the program looks at MID\$(S\$,N,1) to see if that character is a space. If so, the carriage

return is printed to the screen to drop the next word down one line.

WINNERS AND LOSERS. The player's answer, G\$, is compared with the sentence, and has to match exactly. If not, control passes to line 690, where the delay is lengthened. Also, the variable LOSS is incremented. If LOSS ever equals 2, then the player has missed two in a row, and the game is over.

At the end of play, the participant is told what "level" of proficiency has been reached. This is determined by dividing the delay at the end of the game by 10. ▽

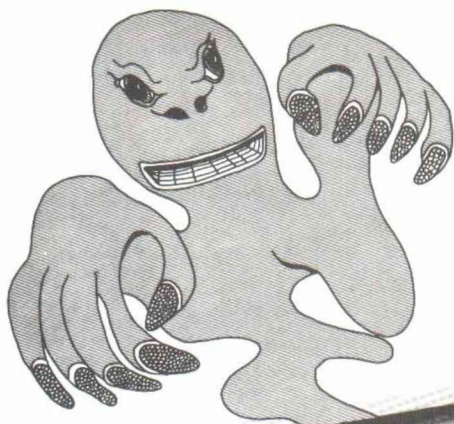
VARIABLES USED IN MEMORY STRETCHER

AS	Used in INKEY\$ loop
COLUMN	Column of sentence data
DELAY	Delay on screen
DU	Dummy variable for RND(1)
FLAG	Set when sentence longer than 25 characters
G\$	Player version of sentence displayed
LE	Level reached by player
LOSS	Number of sentences in a row missed
N	Loop counter
R	Random number
ROW	Row of sentence data
S\$	Assembled sentence

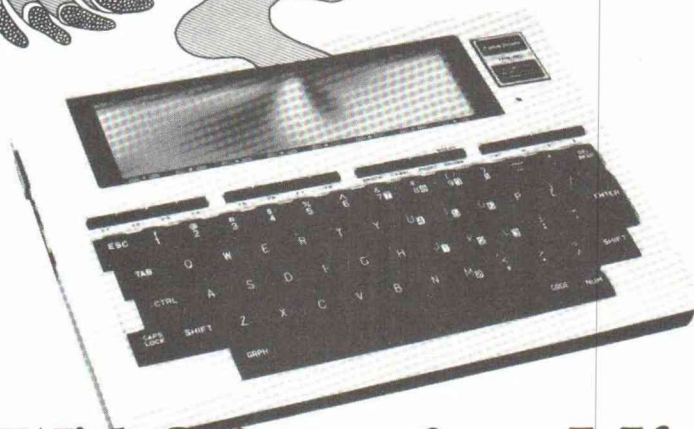
```

10 ' *****
20 ' *
30 ' *   Memory Stretcher   *
40 ' *
50 ' *****
55 ' *** Set Random Start Point ***
60 CLEAR 1000
70 FOR N=1 TO VAL(RIGHT$(TIME$,2))
80 DU=RND(1)
90 NEXT N
100 DIM S$(20,5)
110 DELAY=500
120 DATA Several,Some,Many,A few,
    Thousands of,These,Those

```

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```

130 DATA Your,My,His,Her,America's,
    No doubt,frequently
140 DATA Sometimes,Occasionally,
    Yesterday,Today,Always,Once a
    month
150 DATA yellow,red,fat,large,small,
    big,thin,hungry,sated
160 DATA predicted,early,late,
    appreciated,smart,stupid
170 DATA enthusiastic,rowdy,polite,
    common,silly
180 DATA politicians,programmers,
    elephants,students,swimmers
190 DATA air traffic controllers,
    garbage cans,elm trees,German
    Shepherds,photographers
200 DATA mice,cheap-skates,hoboes,
    strangers,relatives
210 DATA samurai,goats,submarines,
    cockroaches,writers
220 DATA correspond,vegetate,select,
    interpret,orate
230 DATA predict,inspire,slaughter,
    sleep,swim
240 DATA bark,shout,arrive,depart,
    investigate
250 DATA agree,dispair,perambulate,
    instigate,perspire
260 DATA noisily,noisomely,annoyingly,
    cloyingly,loudly
    
```

```

270 DATA softly,angrily,eagerly,
    silently,predictably
280 DATA inanely,quickly,stealthily,
    competently,mysteriously
290 DATA regularly,enthusiastically,
    selectively,incredibly,partially
295 ' *** Instructions ***
300 CLS
    : PRINT
    : PRINT
310 PRINT TAB(12)"Instructions?"
320 PRINT
330 PRINT TAB(16)"Y/N"
340 A$=INKEY$
    : IF A$=""GOTO 340
350 IF A$="Y" OR A$="y"GOTO 360
    ELSE GOTO 410
360 CLS
    : PRINT
370 PRINT TAB(2)"Try to remember the
    phrase, and"
380 PRINT TAB(2)"type it in. It
    appears on screen"
390 PRINT TAB(2)"for shorter time
    each right guess."
400 PRINT TAB(2)"Two wrong guesses in
    row ends game."
405 ' *** Read Sentence Data ***
410 FOR COLUMN=1 TO 5
    
```

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```

420 FOR ROW=1 TO 20
430 READ S$(ROW,COLUMN)
440 NEXT ROW
450 NEXT COLUMN
460 PRINT
470 PRINT TAB(9)"== Hit any key =="
480 A$=INKEY$
   : IF A$=""GOTO 480
490 IF LOSS=2GOTO 1070
495 ' *** Assemble Sentence ***
500 FOR N=1 TO 5
510 R=INT(RND(1)*20)+1
520 S$=S$+S$(R,N)+CHR$(32)

530 NEXT N
540 S$=LEFT$(S$,LEN(S$)-1)
550 S$=S$+"."
555 ' *** Flash on Screen ***
560 CLS
   : PRINT
   : PRINT
570 PRINT TAB(2);
580 FOR N=1 TO LEN(S$)
590 IF FLAG=1GOTO 610
600 IF N>25 AND MID$(S$,N,1)=CHR$(32)
   THEN PRINT
   : PRINT TAB(2);
   : FLAG=1
610 PRINT MID$(S$,N,1);
620 NEXT N

```

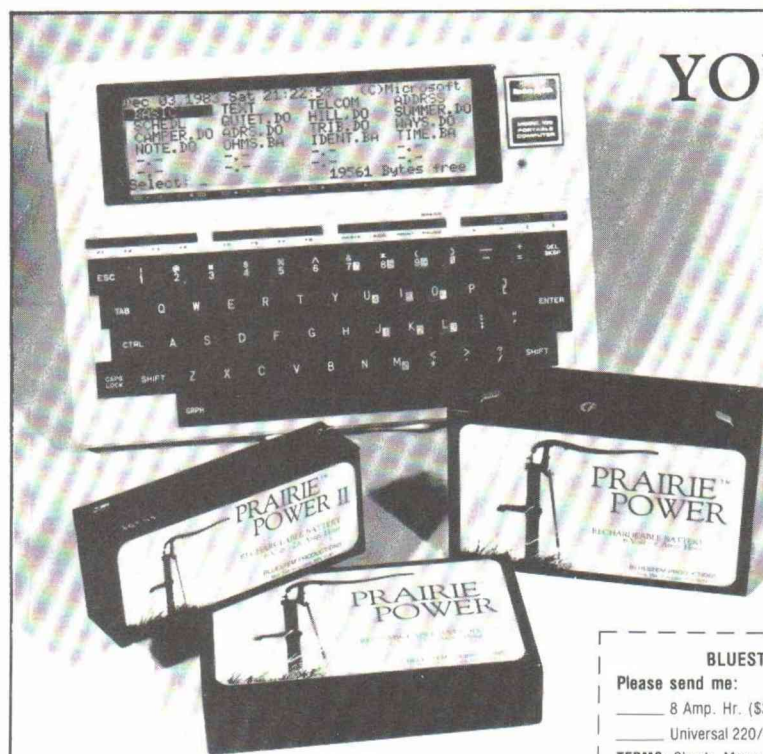
```

630 FOR N=1 TO DELAY
   : NEXT N
640 FLAG=0
645 ' *** Player Re-enters ***
650 CLS
660 PRINT "Re-enter the sentence:"

670 LINE INPUT G$
680 IF G$=S$GOTO 950
685 ' *** Player Wrong ***
690 CLS
   : PRINT
700 PRINT TAB(2)"Wrong-o!"
710 PRINT TAB(2)"You had:"
720 PRINT TAB(1)"";
730 FOR N=1 TO LEN(G$)
740 IF FLAG=1GOTO 760

750 IF N>25 AND MID$(G$,N,1)=CHR$(32)
   THEN PRINT
   : PRINT TAB(2);
   : FLAG=1
760 PRINT MID$(G$,N,1);
770 NEXT N
780 PRINT
790 FLAG=0
800 PRINT TAB(2)"Correct sentence:"
810 PRINT TAB(1)"";
820 FOR N=1 TO LEN(S$)
830 IF FLAG=1GOTO 850

```



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BUSCH

```

840 IF N>25 AND MID$(S$,N,1)=CHR$(32)
      THEN PRINT
          : PRINT AB(2);
          : FLAG=1
850 PRINT MID$(S$,N,1);

860 NEXT N
870 PRINT
      : PRINT TAB(2)"We'll make it
        easier next time."
880 DELAY=DELAY*1.25

890 FLAG=0
      : S$=""
      : G$=""
900 PRINT
910 PRINT TAB(9)"== Hit any key =="
920 A$=INKEY$
      : IF A$=""GOTO 920
930 LOSS=LOSS+1
940 GOTO 490

945 ' *** Player Right ***
950 CLS
      : PRINT
960 PRINT TAB(12)"Right!"
970 PRINT
980 PRINT TAB(2)"Now let's make it
      harder!"
990 DELAY=DELAY*.75

1000 FLAG=0
1010 G$=""
      : S$=""
1020 PRINT
1030 PRINT TAB(9)"== Hit any key =="

1040 A$=INKEY$
      : IF A$=""GOTO 1040
1050 LOSS=0
1051 GOTO 500

1055 ' *** Game Over ***
1060 CLS
1070 CLS
      : PRINT
      : PRINT
1080 PRINT TAB(2)"Sorry, you missed
      two in a row."

1090 LE=INT(DELAY/10)
1100 PRINT TAB(2)"However, you did
      reach level";LE
1110 PRINT
1120 PRINT TAB(8)"Play again?"
1130 PRINT TAB(12)"Y/N"
1140 A$=INKEY$
      : IF A$=""GOTO 1140
1150 IF A$="Y" OR A$="y" THEN RUN

```


BLACK FLAG



E-MAILER. Tandy's business computer merchandising director, Ed Juge, and Jim Myszkowski (CIS ID 70536,1604) found a programming error in Sandy Trevor's automatic e-mail program (*Portable 100*, November 1983, page 46). Line 53 tells the 100 to kill a file while it's still on-line. The 100 can't do that, so the machine will likely hang-up if that option is employed. To counter that problem, Jim wrote on CompuServe's Model 100 SIG:

"I moved line 53 into line 67 and changed the MENU in that line to an END. It seems to work better that way. Also, you can change MENU in line 67 to POWER OFF. That way, when you send e-mail by use of the auto time feature, the 100 will power down after sending."

MUSIC MACHINE. Joel Dinda (CIS ID 75725,1134), co-author of "Music Machine" (*Portable 100*, November 1983, page 25), notes typographical errors in lines 140 and 141 of his and his sister's program. Line 140 should begin INPUT#1, instead of INPU#1. Line 141 should read:

```
IF LEFT$(KY$,1) = "s" THEN KY$ = $$ (VAL (RIGHT$ (KY$,1)))
ELSE KY$ = F$ (VAL (RIGHT$ (KY$,1)))
```

Joel adds the statement :OT\$=TI\$ in line 2020 is unnecessary and can be deleted.

BOWLING GAME. David Marks of Honolulu, HI, identified several typographical errors in David Busch's bowling game (*Portable 100*, November 1983, page 36). Lines 120 and 510 should not have spaces between the quotation marks. The hyphen in line 350 should be an =. A line 230 should be added: 230 A\$=INKEY\$:IF A\$="" THEN GOTO 230.

Our thanks to everyone that informed us of these errors. Since we stopped typesetting our listings, we hope many of these problems won't reoccur, but if you find errors in a listing or have suggestions to better a program, please drop us a line addressed to *Portable 100*, 67 Elm St., Camden, ME 04843, ATT: Black Flag.

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FULL-DUPLEX



Editor's Note: Full-Duplex is dedicated to solving readers' Model 100 problems. Readers needing assistance should address their letters to: Terry Kepner, c/o PORTABLE 100, 67 Elm Street, Camden, ME 04843.

TO MAKE EAGLE FLY, SET 7-BIT PARAMETERS

Any suggestions for telephone parameters between the Model 100 and an Eagle II, 8-bit computer using the "MOVE-IT" program from Wolf Software? The transmission to the 100 comes through fine, but the transmission from the Eagle is garbled.

One way only
San Pedro, TX

First, what are the STAT parameters you're using? If you're transmitting to TELCOM faster than 1200 baud, the problem is TELCOM is losing new characters while it is echoing previous characters to the display. If you're transmitting directly to Basic (i.e., using the LOAD "COM: or LOAD "MDM:), the problem is Basic immediately tokenizes each line of data sent when it receives a carriage-return. While Basic is tokenizing the line, it's ignoring any incoming characters over the RS232. Since you're getting proper transmission in one direction, and garbled in the other, the communication lines must be fine, otherwise nothing would get through.

Make sure you're using the proper word length for communication. Some machines use the eighth bit to signify graphics or special characters, and this could be causing some of your problems. I'd suggest setting the Eagle parameters to seven-bit words, one stop-bit, even parity, XON/XOFF protocol, and 300 baud. For the 100, use STAT 37E1E. If you still have some prob-

lems, use STAT 37N1E and set the Eagle to no parity (sometimes parity checking can get in the way). If you still have problems, call the people who manufacture your software and ask them for advice.

SPEED TRICKS FOR CHOICES FROM A MENU

Which of these basic program lines used when choosing menu options will execute faster?

```
10 A$=INKEY$:IFA$=" "THEN10ELSE
    IFA$="1"THEN20ELSEIFA$="2"
    THEN 30
```

or

```
10 A$=INKEY$:IFA$=" "THEN10
16 IFA$="1"THEN20
17 IFA$="2"THEN30
```

Speedy,
Metropolis, IL

For speed of execution, they're both about the same, although the first will occupy less RAM (line numbers and associated code take five bytes, ELSE takes only one byte). The difference in speed is the entire line of the first routine is placed in the Basic decoding buffer, while the other requires at least one additional fetch. And the second routine doesn't require that Basic scan its token list to find ELSE. Six of one, half-a-dozen of the other. If you have more than just two choices, use something like this:

```
10 A$=INKEY$:IFA$=" "THEN10
    ELSEA=VAL(A$):ONAGOTO100,
    200,300,...
```

The nice thing about this is if A=0 or A is greater than the list in the GOTO, it'll fall through to 20 for appropriate action. Another trick, using letters instead of numbers, is:

```
10 A$=INKEY$:IFA$=" "THEN10ELSE
    ON INSTR("SIAD...",A$)+1GOTO
    100,200,300
```

Actually, the second form could be used for both numbers or letters input via INKEY\$, it's just that numbers are manipulated faster than letters. So converting ASCII "3" to the number three and then using a GOTO or GOSUB is faster than using string comparison routines followed by GOTO or GOSUB.

"SAVE TO:" COMMAND AND EMBEDDED CR ARE SOLUTION

I'm new to the Model 100 and have a problem: I am unable to transfer Model 100 text files to my IBM-PC word processor, Volkswriter, for merging, formatting, and so on. Volkswriter uses PC DOS ASCII text file format, with a maximum line length of 80 characters. The documentation further states every line must end with a carriage-return and a linefeed character. Every attempt to load Model 100 files transferred to disk on the IBM resulted in a "Volkswriter cannot handle records more than 127 characters long." I assume I should be translating Model 100 files to PC DOS format (adding CRs and LFs) using a brief Basic routine but until now, the correct program has eluded me. Any help would be much appreciated.

Too big
Ardley, NY

If you're using TELCOM to make the transfer, the problem is TELCOM only sends a CR at the end of each line transmitted. No matter what line length you specify, VW isn't getting the CR/LF combination it needs for each line. Since you want to add the linefeed characters (ASCII 10), just write a simple Basic program that opens two sequential files, one for input and one for output. For input,

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read the Model 100 file, add the linefeed character after the carriage-return, and send the line to the output file. Then read the next line of the file.

A simpler method is to use the "Save to:" command of TEXT or Basic (F3), and specify "COM:stat". This will place the linefeed after each carriage-return, as it is transmitted from the Model 100. In order for this to work with your word processor, the carriage-returns have to be embedded in the file every 80 or so characters, as the "Save to:" command doesn't ask you for a width as TELCOM does.

CORRECT DIP-SWITCH SETTING ALLOWS HOOK-UP

How do you hook up an Epson printer with the Model 100? Do you need a special cable? Everything gets printed on one line. Any help would be appreciated.

Feedless
Walker, TX

▲The problem is a wrong DIP switch setting in the printer. If you read your

printer manual, you'll discover you have a choice of having the printer perform an automatic line feed when it receives a carriage-return, or let the computer supply both the carriage return and the linefeed.

The Radio Shack printers are all designed to automatically supply the line feed when a carriage return is received. Set the appropriate DIP switch in your Epson and you shouldn't have any problems.

UNWANTED CHARACTERS HARD TO ELIMINATE

Is there any way to change the character generator chip (or whatever it is) that determines what characters appear on the LCD? Many of the characters now available with ASCII values above 127 are useless to me, and many others would be much better. The best solution would be to have software control of the characters. The next best would be to choose the ones in hardware. Can you help?

Unneeded Characters
Fairfield, CT

Unfortunately the bit patterns for the characters are in ROM and would require reprogramming and replacing it, no simple task since the ROM is a custom design. Sorry.

You could design a character set in memory and use graphics commands to write them to the display, but I think you'd find that takes too much RAM, and is very slow.

CAN GET THERE FROM HERE WITH CORRECT EXTERNAL MODEM

Is it possible to get to the Model 100 MENU from TELCOM without having to disconnect and lose the modem/RS232 carrier signal?

Need the MENU
Eliot, IN

▲Sorry, but you can't do that using the internal modem. If you have the right external modem (e.g., the Radio Shack Modem II), you can do that.

Some external modems ignore the presence or absence of a signal from the RS232 and don't disconnect until

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you hang-up, or give a disconnect control command to the modem.

Leaving TELCOM requires that you disconnect. I've been told you can disable the disconnect code by POKE-ing the appropriate memory location, but no one knows for sure which location it is to use.

Finally, if you disable the disconnect, you have to remember to re-enable it when you're finished communicating, otherwise the Model 100 will continue to keep the modem/RS232 port "alive", decreasing battery life by about half.

SLUGGISH CURSOR CURED BY TURN-OFF OR COLD START

Yesterday I went to use my Model 100 and noticed the keyboard was very sluggish and the cursor was blinking very slowly. Characters were lost when I tried to type at normal speeds. I turned off the memory switch for a few seconds and the cursor was restored to its normal speed and normal typing was possible. Has anyone else

experienced this strange behavior? What causes it?

Sluggish Cursor
Minneapolis, MN

▲ I haven't tried 9600, but 4800 works just fine. First, turn off the "disk write during receive" (DTD, <CLR><7>). LCOMM misses characters during the disk access, since interrupts are off and it doesn't know a character has been received by the RS232, thus not fetching the character before another character arrives. Also turn off your display (<CLR><2>), trying to buffer data to both the display and memory can cause you to lose characters at high transfer rates. Another problem area is background tasking, which could be stealing CPU time, and again resulting in lost characters. Removing these three potential problems should let you increase your data transfer rate.

I think the upper limit of transmission and reception baud rates is the CPU clock speed. I use my Model 100 with a Lobo Max80 computer (4MHz), with LDOS 5.1.3. as the operating system and LCOMM as the RS232 pro-

gram. Going from the 100 to the Max80 I always use a transmission of 19200 (97E1E), with LCOMM using the standard defaults, except for baud rate of course.

In your case, start with 600 baud and work your way up until you again start losing characters. Going in the the reverse direction, LCOMM to Model 100, the maximum transmission speed seems to be 600 Baud. TELCOM tries to update the display before fetching the next character from the RS232, resulting in lost characters since the display is so slow. Using the "LOAD:COM" feature from Basic is similarly limited, only instead of waiting for the display, you have to wait for Basic to tokenize each line received.

Oddly enough, if you have an 8K computer, you can operate at higher Baud rates than a 24K computer, which can operate slightly faster than a 32K computer. It has something to do with the way the Model 100 operating system maintains memory overhead while in the process of storing data.

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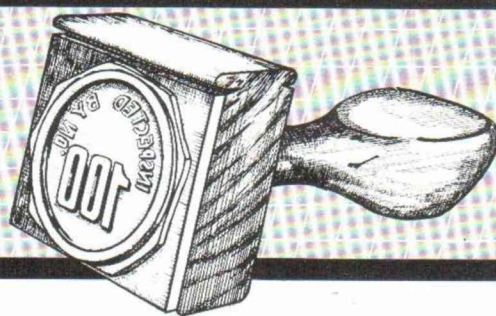
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REVIEWS



A PAIR OF WINNING PROGRAMS BY SKYLINE MARKETING

PortaStat and PortaMax

Skyline Marketing Corp.
4510 W. Irving Park Road
Chicago, IL 60641
312-286-0762
Minimum of 16K required,
24K preferred (each program)
\$44.95 each

By SCOTT L. NORMAN

Skyline Marketing is off to a fast start in the race to supply useful business-oriented software for the Model 100. Its PortaCalc spreadsheet (see *Portable 100*, October 1983, page 17) was one of the first on the market; now it is joined by Michael L. Peck's PortaStat, an interactive program for doing descriptive statistics and linear regression calculations, and PortaMax, an equally interactive linear programming package.

Both of the new programs interface with PortaCalc files, although they can also be used as stand-alones. Both give the user the same sort of "feel" in operation, as well. These can be important considerations when one is putting together a software library.

PortaStat and PortaMax are each furnished in Skyline's new professional-looking format: an 8-inch-by-9-inch, 3-ring binder with padded cover incorporating a plastic cassette holder. You will probably want to keep the program cassettes in these holders, too. These are big programs, and unless you use them constantly, you are unlikely to keep them in RAM for very long. Instead, you may find yourself reloading them whenever needed, so it may pay to keep those tapes handy.

One note before starting: I hope prospective purchasers will forgive my

occasional lapses into mathematical jargon; I have to use the appropriate language if we're going to get anywhere at all.

PORTASTAT.

PortaStat incorporates several of the most useful procedures of conventional descriptive statistics: finding the mean, standard deviation, standard error of the mean, and correlation and covariance matrices for a series of observations on several variables. It can also carry out simple and multiple linear regression analyses, and will generate analysis of variance tables and data on the coefficients of the regression model.

The program certainly doesn't require the user be a professional statistician, but a certain degree of familiarity with terms such as I have used is necessary. It only seems reasonable to ask that anyone trying to employ statistical methods of data analysis have some idea of what they are looking for!

The manual is divided into general operating instructions and a reference guide. The former gets you "on the air" in a hurry, while the latter provides detailed coverage of each command. Most commands result in a series of prompts, and these are all described, together with the resulting output (if any). In addition to the commands for descriptive statistics and linear regression, there is a whole series for data and file creation and manipulation, a few more for data display, and a few utilities for finding normal and student distribution functions.

RAM REQUIREMENTS. PortaStat itself requires about 10K of RAM, the size of the data base you can manipulate depends only on the amount of memory remaining after the program is loaded. The documentation quotes 11K as being enough for 100 observations on

each of 14 variables, or 50 observations on 22 variables. Clearly, you can get by with considerably less and still have room for an entire 26-row-by-14-column PortaCalc file.

Such files are just one of the possible sources of input for PortaStat; the others are keyboard entry, tape or RAM files which have been prepared in PortaStat's own format, and similarly-formatted files downloaded via the Model 100's documentation facilities. The manual includes a short program for writing a file in "Stat format". This differs from the triple-entry value/label/formula format used by PortaCalc; PortaStat itself performs the conversion on spreadsheet files, stripping off the labels and formula and reading only the data values.

Data are contained in .DO files, so they can be edited by the Model 100's TEXT program as well as by PortaStat itself. The extent of the required editing will probably govern which method you use. The file structure is certainly simple enough to let you use TEXT for a quick update when you don't care to redo all your calculations at the moment. PortaStat's editing commands require that you load the data file and then respond to several prompts; you may not always want to take the time.

To exercise the review copy of the program, I first copied a *Business Week* "Investment Figures of the Week" table. This provides four observations (measurements) on 17 variables (statistics of interest to investors). The observations are the values for the latest week, one week ago, one month ago, and one year ago; the variables include the Dow Jones Industrial average, Standard & Poor's 500-stock index, interest rates for Treasury bills and various grades of bonds, and so forth. Following conventional statistical practice, the variables were used as the columns of a rectangular matrix, while each observation formed one row.

PRINT OR DISPLAY. The raw data matrix, as well as the correlation and covariance matrices, can be reviewed on the LCD display or in hard copy. PortaStat has an I/O switch command, "iosw", which sets the device and file configuration for proper formatting. In this case of printer reports (device name "lpt:"), it gives you the option of specifying an 80-column line and a 66-line page, for example. Naturally, the default setting for the display, "lcd:", is 8 lines of 40 columns each, so large matrices must be viewed in sections.

I have just given some examples of typical PortaStat syntax. All commands have four-letter abbreviations, and must be entered in lowercase. Those colons after I/O device names are critical, too. To save typing, the program makes full use of the Model 100's programmable keys for some common functions:

F1: Enter (load) a data file;

F2: Save a data file;

F3: Calculate the mean, standard deviation, and standard error of the mean for each variable;

F4: Compute the matrix of correlation coefficients among any specified subset of the variables. Since this is a symmetric matrix, only one half (the lower) is actually displayed. Rows and columns are automatically labeled with names which the user assigns to the variables;

F5: Compute the covariance matrix for any subset of the variables. This is related to the correlation matrix: the correlation coefficient between any two variables is the ratio of their covariance coefficient to the geometric mean of their individual variances;

F6: Compute a linear regression model, the associated statistics, and the fitted and residual values from the regression. Any variable in the data set may be designated as the dependent variable, and any subset of the remainder may be used as independent variables (Predictors);

F7: Print any subset of the data array; and

F8: Exit PortaStat and return to Basic's command level.

GRAPHIC OUTPUT. As you can probably imagine, PortaStat is capable of generating a lot of numbers in a short time — a common characteristic of statistics programs! There is only one piece of graphical output, a bivariate scatter plot of data.

The routine is accessed by the "scat" command, and it generates a small graph of one variable plotted against another. To eliminate the need for an involved scaling routine, the variables are standardized: the appropriate mean is subtracted from each, and the result is divided by its own standard deviation. The result is a universal set of axes, ranging between ± 3 standard deviations from each variable. Any relationships between the variables will be preserved by this scaling.

I found the scatter plots to be very useful when poking around in a data set for strongly correlated variables; large positive correlations lie near a 45-degree line. It should come as no surprise that the rates on three-month and six-month Treasury bills and three-month commercial paper are all strongly correlated, but now I can prove it! Unfortunately, the screen graphics cannot be routed to the printer.

The linear regression analysis produces no outputs of its own, except for warning messages in certain pathological situations. Two additional commands are used to obtain the results: "anov," which gives the basic statistics from the analysis of variance table, and "coeff," which produces the estimates of the slope and intercept of the least squares line produced by the analysis. The standard errors and tests of significance of the slope and intercept are also included.

Another command, "Pred", uses the regression model to predict value of the dependent variable. The independent variable(s) can be entered from the keyboard, or from the data array itself.

CURVE PROBLEMS. The lack of graphical output for the regression analysis presented me with a bit of a problem. It is common practice to try to improve the fit of a linear regression line by transforming the data, but I find it difficult to judge what to do when a table of numbers is all I have to go on. The "scat" plot helps a bit, but

it's pretty small for making fine distinctions about the shape of a curve. Of course, this is a consequence of the size of the Model 100's display.

Assuming you can decide on a likely transformation, though, PortaStat's "train" command can help you carry out most of the common operations: adding or multiplying by constants, taking logarithms, exponentiating, raising to powers, and standardizing (as in the "scat" routine). More complex transformations can be carried out by repeatedly invoking this command.

In general, I found PortaStat to be useful and well documented. It isn't the vehicle to use for learning statistics, and it certainly doesn't have all the bells and whistles of big-machine (or even "big-micro") programs, but it can do a good job of rapid data analysis in the laboratory, office, or factory. A model 100 with 32K of RAM can comfortably hold PortaCalc, PortaStat, and a couple of small data files; you can get a lot of use out of a combination like that.

PORTAMAX. PortaMax allows the Model 100 user to employ the classic simplex method of linear programming without knowing any of the mathematical details. In other words, the program gives you the ability to maximize or minimize linear functions of several variables, subject to constraints which can be expressed as linear inequalities themselves.

That's quite a mathematical mouthful; here is the example used in the PortaMax documentation. The problem is to maximize this particular function of the three "decision variables" x_1, x_2 , and x_3 :

$$-x_1 + 3.5x_2 + x_3$$

subject to these four constraints:

$$2x_1 + x_2 + x_3 \leq 20$$

$$-x_1 + x_3 \leq 5$$

$$x_1 - 2x_2 \leq -1$$

$$x_2 + 2x_3 \leq 6$$

(The \leq combination is the symbol for the "less than or equals" condition.)

In addition it is required that each of the three variables be positive, but that is built into the program's structure and need not be entered as a separate constraint.

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PortaCalc

SIMPLEX METHOD. I have said the user need not understand the details of the simplex method in order to use PortaMax; however, it should be clear that the ability to formulate a problem in terms of an expression to be optimized under appropriately-framed constraints is necessary. The expression is called the objective function, and the combination of the objective function and the constraints is called the model. Managerial science, engineering, and operations research provide plenty of examples: distribution problems, transportation problems, financial analyses, and so on.

Full-fledged problems may involve thousands of variables and constraints. What can the Model 100 do? The manual provides a rough guide. A 24K computer with PortaMax as the only file in RAM can accommodate one of the following mathematical models:

14 variables, 24 constraints;
40 variables, 20 constraints; or
80 variables, 10 constraints.

This may be enough for managerial budgeting applications, to give you one example that's near and dear to my heart.

MEMORY TAXES. PortaMax requires about 9K. The memory required for a model, and the time required to find a solution, are more sensitive to the number of constraints than to the number of variables. We'll see an example later in this review.

Models may be entered from the keyboard, or PortaCalc can be used as a text editor to prepare data files. If PortaCalc is employed, the largest model that can be examined will contain 12 variables and 234 constraints.

Like PortaStat, PortaMax uses four-letter lowercase command names. The function keys can be used for eight of the nine major commands:

F1: Enter a model;

F2: List the model. This is useful for checking your data-entry work;

F3: Edit the model. This has a number of subcommands for editing any portion of the model, including changing the exercise's goal from "minimize" to "maximize," and vice versa.

F4: Solve the model. Outputs are the optimized values of the objective function and each decision variable, the reduced cost of each variable, the amount of slack for each constraint (i.e. the margin by which each inequality was satisfied), and the dual price (the worth of an additional unit of each variable);

F5: Perform a range (sensitivity) analysis. This calculates the amount by which each coefficient in the objective function can increase or decrease without violating the optimal solution. It does the same for the right hand side of each constraint, as well. "INF" is used to denote an infinite allowable change;

F6: Solution report. This command repeats the last output of the F4 and (if desired) the F5 keys without re-doing the entire analysis;

F7: Save the model to a file. This can be in either PortaMax or PortaCalc format. If the latter is chosen, the most recent optimal values for the decision variables and objective function are preserved. PortaMax format saves only the model description; and

F8: Exit to Basic command level.

The ninth major command is "iosw," which performs the same function as in PortaStat.

Models are entered from the keyboard in a natural format. There is a special entry prompt for each line — the colon. The first entry is "max" or "#min," depending on what you want to do. Then comes the objective function, the "st" (for "subject to"), and then the constraints, each on its own line. After the last constraint has been entered, typing "end" terminates the procedure.

CONVENTIONS. There are a few conventions which must be obeyed when entering a model into PortaMax. All terms involving decision variables should appear on the left hand side of constraints; terms should be collected so that each variable appears at most once in the objective function and in each constraint. The example shown above is already in this form.

One way in which the example deviates from the standard is in the negative value for the right hand side of the third constraint. This must be changed

to a positive; the procedure is to reverse each algebraic sign and the sense of the inequality symbol. Thus the original becomes:

$$-x_1 + 2x_2 > 1$$

It is also worth noting PortaMax cannot accept combinations such as \leq ; the inequality sign must be used by itself.

Once the model is entered, the solution is obtained fairly quickly — at least for small models. Just under 12 seconds were required for PortaMax to find the solution to the example I have quoted here:

Maximized objective function = 21
 $x_1 = 0$
 $x_2 = 6$
 $x_3 = 0$

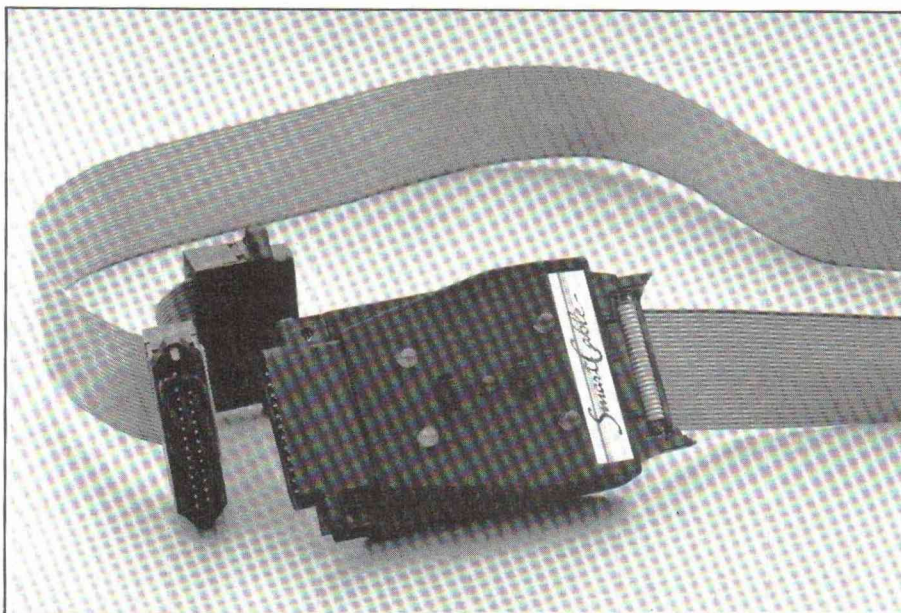
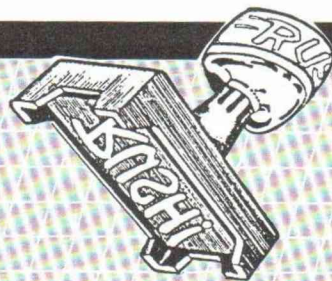
and so on. (Try these values for yourself!) Two iterations were required.

The solution time increases rather dramatically for slightly larger models. I tested PortaMax with a 5-variable, 8-constraint problem from the textbook "Algorithms for Network Programming", by J.L. Kennington and R.V. Helgason (Wiley, 1980). The problem was no more exotic in form than the example I have been using, but the program required 5 iterations and just under 49 seconds to reach a solution. Another 10 seconds or so were required for the sensitivity analysis.

MAINFRAMES UNTHREATENED. I suppose every prospective user must make his or her own evaluation of such processing times. They certainly represent no threat to mainframe performance, but remember the circumstances: the Porta- series programs are written in Basic, for use on a machine whose biggest virtues are portability and well-integrated software — not speed. Viewed in that light, they may well be acceptable.

These two programs are certainly easy to use, and together with PortaCalc they form a nicely-integrated set. My personal opinion is that they add quite a bit to the versatility of the Model 100. Some day, I suppose, we will have plug-in ROMs for all of these applications, with blistering speed and the capability of handling much larger data files. In the meanwhile, PortaStat and PortaMax may just be able to help you do some work that won't wait. ▼

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Code Keeper, written by Roby Sherman, uses only 1K of memory. It costs \$25 and includes documentation, program cassette, and all shipping charges.

The package is available from Sherman Electronics, P.O. Box 63-04, Miami, FL 33163, or can be ordered by phone 305-944-2111 and charged to Visa or Master Card.

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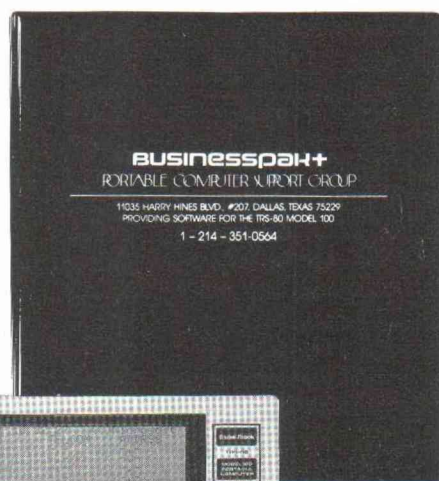
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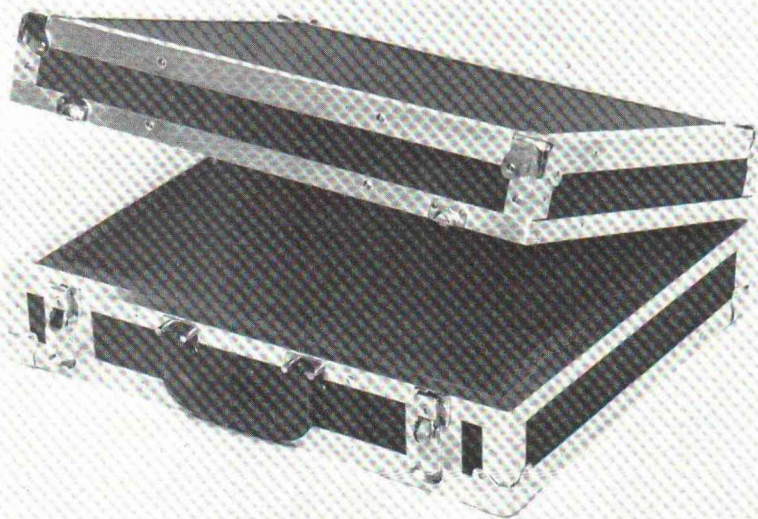
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An individually packaged towelette, Staticide Wipes, reportedly helps to reduce static-related problems identified as a major cause of service calls for computer, word processing, and other static-sensitive electronic equipment.

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Each 5-1/2-inch-by-8-inch (unfolded) towelette is packaged in a 2-inch-square foil flatpack, 24 per box. Suggested list price per box is \$4.98.

For free samples and more information, contact ACL Incorporated, 1960 E. Devon Avenue, Elk Grove Village, IL 60007, 312-981-9212



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The compact Messenger Module is compatible with virtually all personal, home, and small business computers. Suggested retail price is \$170.

Interested readers can contact Theresa Conetta, Director-Custom/Citation Marketing, Smith-Corona, 65 Locust Avenue, New Canaan, CT 06840, 203-972-1471.

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Do you need new product editors on computer publications? How about the assistant editor who handles computer news? Who do you address news releases to? What you need is the Computer Media Directory.

In ready-reference form, each page gives you the name of the publication, the publishing house, the address, and main telephone number for every computer-related publication in the United States and Canada. It's in easy-to-use, loose-leaf form, and contains 476 pages. The cost for the directory, and three quarterly updates is \$149.95.

An introductory offer is available, with a money-back guarantee. You can return the book for full refund or cancellation of charges if not satisfied within 10 days. Contact Computer Media Directory, 3220 Louisiana Street, Suite 213, Houston, TX 77006. ✓

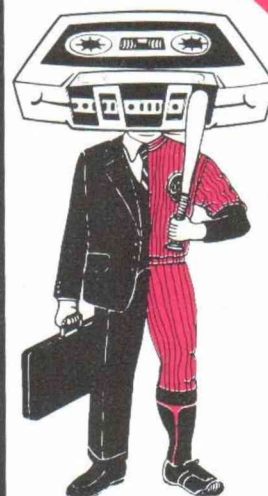
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END TRANSMISSION



THE RABBIT OF COMPUTER EXPOS SHOWS INDUSTRY AT CHILDHOOD'S END

I almost didn't make it to COMDEX this year. I compromised and shortened a planned four-day stay to one and a half. It's not that I dislike Las Vegas, COMDEX, or traveling especially. I felt overwhelmed by the event before I ever left Camden. I'll explain.

Behind my desk, on a little table, is a stack of press releases announcing various events to take place at COMDEX. New computer releases are in one section of the pile; special luncheon invitations in another; unusual events, side attractions, and passes to hot tubs and raquetball courts are jumbled together in the miscellaneous section of the pile.

When I asked John Mello what he wanted me to cover for *Portable 100*, he said something about digging up all I could on the new portables announced there. "How many new portables will there be?" I asked expecting John to say one or two. "19," he said. "19!" I exclaimed.

I dove (almost literally) into the pile of releases behind me. After a quick scan it became clear to me I lacked even more foresight; my pile was woefully inadequate — I hadn't the foresight to create a New Portables section. Even worse, I must have thrown at least half of the releases sent to me out. To explain that, let me digress a bit.

Computer shows are all the rage nowadays. It seems someone can't come up with a computer innovation without someone else deciding to do a show about it. Some shows are truly useful gatherings; possibly as high as 10 percent of them. Many others are clearly entrepreneurial attempts at

cashing in on the fast growing computer market without having to bother to learn much about computers.

So picture me in my office, my pile of releases scattered about like leaves in October, with a mission to get the facts on 19 new portables to be announced at COMDEX. I almost canceled my newest flight arrangements. I did the only thing possible given the impossibility of the situation; I threw the whole pile out and went to catch my plane.

COMDEX is the rabbit of computer shows. This year the event encompassed three hotel showrooms and the Las Vegas Convention Center — a sprawling complex of show floor square footage.

Las Vegas, Convention City, USA, was taken to the edge servicing the needs of we COMDEXians.

Cabs were always seen and always full. You might walk a mile to put

yourself in a good spot for hailing a taxicab.

Finding a meal without having the forethought to call ahead and make a reservation was no more than slightly humorous.

More than 80,000 people attended. It was impossible to get to know all of them.

Even so, COMDEX/Fall '83 was a pretty smooth event. The people of Las Vegas seem to be an understanding and helpful lot.

COMDEX's atmosphere was not overly electric like computer shows of the previous few years. Instead, the atmosphere was that of surging momentum, as if the computer industry has finally advanced from its infancy to the first stages of adolescence.

John was right, there were a lot of new portables, both lap and transportable, making debut appearances. Although some were impressive machines, it seemed to me that the market is still behind Tandy in the development of truly useful and reasonable priced portable computers. Just how far behind is difficult to gauge. I, for one, am looking forward to 1984 with eager anticipation.

NEXT 100

We're all trying to find ways for our 100s to clear the paper glut on our desks and the second installment from Erickson and Sayre's book will do that for teachers. They'll be offering a program to track students' grades and automatically average them.

For those of us who've pined to have a microcassette recorder interface with the 100 for storage, Bill Templeton will be looking at three popular micros and telling us how keep the conversation going be-

tween them and our 100s.

Have you ever written a program you thought would be better if it had search functions like SCHED and ADRS? Jesse Bob Overholt will tell you how to write a Basic subroutine to access those functions.

And for the word-processing fanatics among us, Dan Shafer will be reviewing some of the leading word crunchers for the 100.

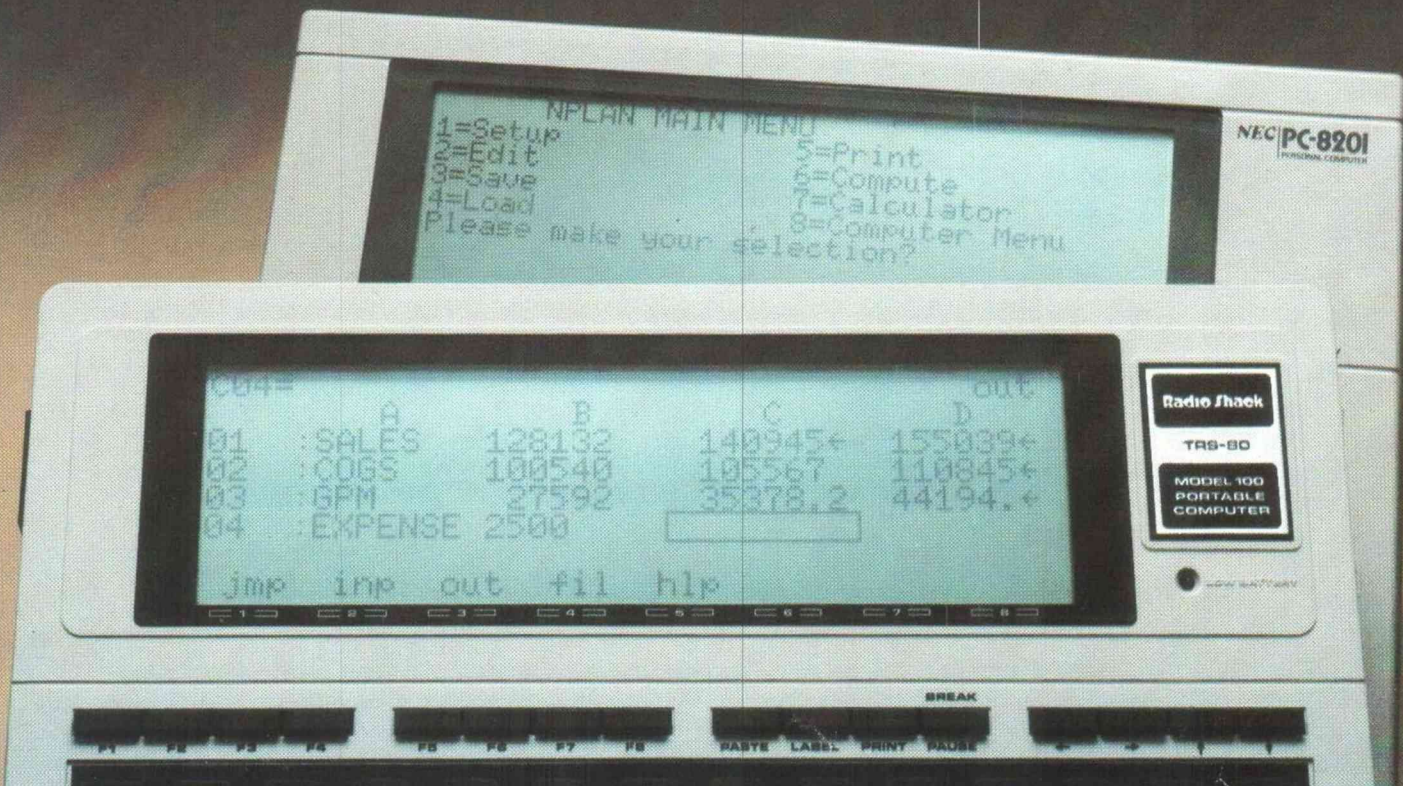
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